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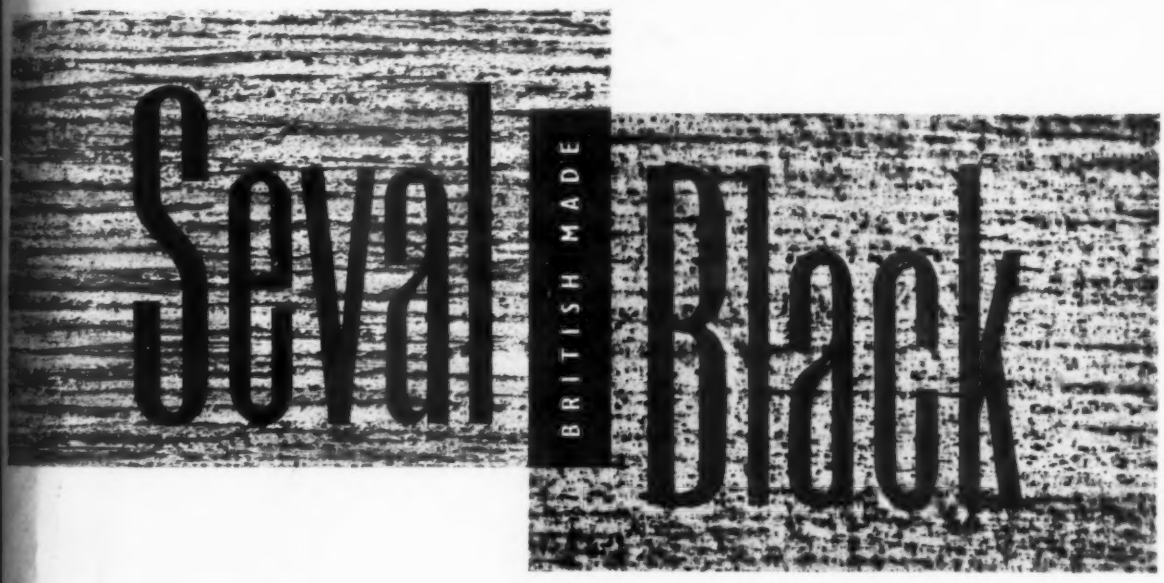

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IN ITS 75th YEAR

February 7 1959

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NOTES of the WEEK

Recruiting for Rubber

EMPHASIS these days is very much on the need for increased facilities for technical education; rather less, perhaps, on the employment opportunities that exist, and will exist, in industry. The decision of the Federation of British Rubber and Allied Manufacturers to take a stand at the National Education and Careers Exhibition (reported elsewhere in this issue) is, therefore, to be welcomed. It is an enterprising and imaginative move that must prove of great potential value to the industry. It is to be welcomed not only on the grounds that it will serve to keep before the public eye the tremendous and immensely varied contributions of the rubber industry to so many aspects of modern living but also because it will provide parents, teachers, schoolboys and girls with visual evidence of the excellent opportunities in the industry. There is already considerable competition among industries for recruits of the right calibre. With technical processes and methods becoming increasingly complex, this state of affairs is not likely to improve and it is, therefore, of the greatest importance that every effort should be made to attract recruits—and in many ways the earlier this is done the better. On the FBRAM stand, potential recruits will be able to see for themselves, from the ground up, for they will be standing on rubber flooring, something of what the industry is doing; something of its fascination and of its outstanding achievements. Undoubtedly an impression will be made and it is up to the industry to see to the organization of a steady flow through the years of 'reminders' in various shapes and forms.

Common Language

FREQUENTLY, but obviously not often enough, it has been said that man can progress, in any real sense, only through education. It has now been said again; this time by Sir David Eccles. In making a call for a further drive in education throughout the Commonwealth, the President of the Board of Trade emphasized especially the teaching of English. Speaking at the Australia Club dinner last week, Sir David Eccles referred to the recent Montreal Conference. 'There', he said, 'Minister after Minister made it plain that the pace of Commonwealth development and, one could say, the cohesion of the Commonwealth itself, would depend even more than we had realized on a rising standard of education for the 650 million of our great family'. He went on to plead 'for what comes first: that is a knowledge of the English language without which the future of the Commonwealth cannot be secure', and he added, 'The English-speaking countries now have a chance to make their language the common language of the world'.

Problem

THE problem of language, particularly in connexion with the presentation and exchange of scientific work, has been referred to before in these columns. Quoted then were figures for scientific journals of which some 44% are published in English; 14% in German; 13% in French; 8% in Russian (a figure that is increasing); 5% in Spanish and 4% in Italian, with the remainder in other languages. The problem of making English a common world language —in the majority of cases, of course, it would be a second language for those whose native language will not carry modern knowledge—seems at first sight a stupendous task, but it is lightened to some extent because of the hunger of vast numbers of people to share, as Sir David Eccles said, 'the fruits of the age of science'. The question is what language they will choose. Sir David said he was confident the great majority would prefer English. He is probably right.

Press On

SO often, when one considers education, it seems that thinking must proceed, as it were, by backward steps. For example, realization dawns that there is a tremendous need for scientists, technologists and technicians; this is followed by a growing awareness of the need for much more basic and more widespread education. Then arises, among others, the question of language; a common language. English is a very reasonable choice. But although it is probably more widely understood than any other single language, dialects included, there is much that should be done to it in order that English may become not only the reasonable but the natural choice for a common language. The Americans have made some headway in ironing out the differences between sound and spelling, and science, with much of its terminology already international, has also helped. In this country we are well aware of, and even have a certain illogical affection for the unparalleled idiosyncrasies of our language. But it is only necessary to recall a recent story to understand the difficulties of other nationals. This recounts the efforts of a certain continental gentleman who struggled gallantly with the intricacies of English and believed himself to be making some progress when he happened to pass the London theatre where the current Agatha Christie thriller is being played. There he read on a poster 'Mousetrap—Pronounced Success!' and abandoned all hope.

NEWS *Briefs*

SOVIET SEVEN-YEAR PLAN — 1958 FRENCH TYRE EXPORTS — CANADIAN DU PONT INCOME REICHHOLD POLYESTER PRICES — UK STRIKE

●**United States**—The Firestone Tire and Rubber Co. has announced plans to build a plant for producing synthetic Diene and Coral rubbers. Diene is a partial replacement for natural rubber, and Coral is said to be a complete replacement. The plant will be an addition to Firestone's petrochemical centre at Orange, Texas. It will have an annual capacity of 30,000 tons of either product, and the company will be able to change from production of one to the other as demand dictates.

●**France** — Tyre exports from France in 1958 totalled 45,879 tons, compared with 41,861 tons in 1957. Tyre imports fell to 8,550 tons in 1958 from 9,007 tons in 1957.

●**Germany** — Member firms of the West German Rubber Industry Association processed 167,730 tons of rubber last year — 4½% more than in 1957, Reuter reports. Between 1956 and 1957 the increase was 4.6%. Synthetic rubber processed in 1958 rose to some 30% of the total from 28½% in 1957. Consumption of synthetic rubber in 1958 was 50,300 tons against 45,800 tons in 1957.

●**United States**—B. F. Goodrich and Co. has announced the discovery of a rubbery substance which it says gives important qualities to both natural and synthetic rubbers. The material, the chemical name of which is brominated butyl, makes natural rubber hold air as well as the best synthetics. In addition, it is expected to be used widely as an adhesive in the manufacture and retreading of tyres.

●**Russia**—The new Soviet seven year plan, covering the years 1959-65 inclusive, provides for an increase in industrial output of about 80%. Overall output of chemicals is to be increased nearly three times, plastics, seven times, and synthetic fibres, 12-14 times.

●**United States**—Passenger tyre sales in the US in December rose 34% above the recession level of a year ago, while truck tyre sales jumped 38%. Farm equipment tyre sales were up about 50%. With both original equipment and replacement demand pointing upward, tyre men calculate 1959 will be a record year for passenger tyres. Estimates run between 94 and 95 million, topping the peak of 93.7 million in 1955.

●**Chile**—The Chilean Ministry of Commerce has lifted the ban on tyre exports (imposed originally because the raw material used was paid for with hard currency) to permit Industria Nacional de Neumaticos S.A. (INSA) to export 4,000 tyres of exceptionally large sizes. This will enable the company to liquidate some of its stock and, by improving its financial position, avoid dismissal of some workers.

●**United Kingdom**—Three hundred employees at the Goodyear tyre factory at Glasgow who had been on strike since the previous Monday, decided on January 30 to return to work. The dispute arose from the dismissal of the chairman and the secretary of the Goodyear branch of the Transport and General Workers' Union for 'refusing the instruments of a supervisor.' They had intervened on behalf of an operator who had been dismissed.

●**United States** — Reichhold Chemicals, Incorporated, announced on January 29 a reduction of 1 cent a lb. in polyester resin prices, bringing quotations for lorry and carload quantities to 33 cents a lb. Prices were also cut by ¼ to 1 cent a lb. on alkyd resins.

●**Canada**—Net income in 1958 of Du Pont of Canada amounted to $5,235,000, equal to 70 cents per common, compared with $4,491,000, or 60 cents per share, previously, according to a preliminary report. Sales rose 12% to $81.7m.

●**Israel**—Tyres and tyre repair materials to the value of US$550,000 are to be exported to Finland by Israel during 1959.

●**United Kingdom**—Damage to roofing and machinery was caused by a fire at the Deykin Avenue, Witton, Birmingham, works of Alfred Roberts and Sons Ltd., rubber manufacturers. Production was not affected.

●**United States**—Dayton Rubber Co., Detroit, has announced a programme of expansion which will virtually double its tyre manufacturing capacity. Mr Harry Goodenberger, vice-president, said recently that the first of several conveyor lines already had been installed and new presses and tyre-building machines were being delivered at regular intervals. When the expansion was completed next autumn, Dayton Rubber would have a completely in-line tyre production.

'The shop steward would like a few words with you O'Flaherty!'—425

FBRAM Enterprise

STAND AT CAREERS EXHIBITION

THE Federation of British Rubber and Allied Manufacturers is to have a stand at the National Education and Careers Exhibition (Olympia, London, May 26 to June 5 1959), which is the first of its kind to be held in Britain.

Artists drawers of the FBRAM stand at the National Education and Careers Exhibition

The stand, 374 sq. ft. in area, is being organized by the publicity committee under the chairmanship of Mr E. S. H. Janes. The design is by Mr A. A. Maw, whose services have been loaned by the Dunlop Company. Among the exhibits will be a device, designed especially for the occasion by J. H. Fenner and Co. Ltd., which will illustrate the great strength of modern rubber-to-metal bonding. It is to take the form of a 'trial of strength' machine, which should be both instructive and popular. It is hoped, also, to feature a working exhibit of eraser manufacture, in which erasers would be made on the stand, and given away as souvenirs. Another item on show is to be a nuclear 'dry box' showing the apparatus and the special rubber gloves used by the operator.

Further displays will feature facts and figures as well as illustrate the many opportunities that exist in the rubber industry, and there will be a map of the UK showing the distribution and location of factories. Leaflets designed for the occasion will be distributed to schoolboys and girls. Panels devoted to natural rubber and synthetic rubber will contain also details of the growth of these industries.

A panel to include pictures and physical exhibits, will be used to illustrate the achievements of the rubber industry. The accent in these will be on visual appeal of an uncommercial nature showing, for example, the setting up of the world land speed record and other records, rubber equipment used on the recent Antarctic Expedition and in submarines.

The stand, in which the Natural Rubber Development Board are participating, will be manned by people who can advise and give information about the industry.

An attendance of over 100,000 is anticipated by the exhibition organizers and wide coverage of Press, radio and television is expected. The careers section is to occupy 20,000 sq. ft. in the gallery of Olympia's National hall.

Royal Visit

Her Majesty the Queen, who is Patron of the National Union of Teachers, will be prevented by reason of overseas visits from opening the exhibition but it is understood that it is her intention to visit Olympia during the exhibition. The Prime Minister, Mr Harold Macmillan, has accepted an invitation to a public dinner which is to be held to mark the occasion.

IRI South Africa

THREE BRANCHES IN NEW SECTION

AUTHORITY has been given, and the first steps have been taken, in establishing a South African Section of the Institution of the Rubber Industry consisting of a central Council in Johannesburg with branches in Johannesburg, Durban and Port Elizabeth.

The new section will work to promote the development of polymer science and technology, to encourage technical education and provide a means of association between persons engaged in the rubber industry in South Africa.

This was confirmed at a meeting of the Council of the Institution held in London on January 27 when an application received from Provisional Committees set up in Johannesburg, Durban and Port Elizabeth, seeking the necessary permission was unanimously approved.

South African companies and personnel engaged in rubber and plastics manufacture are invited to apply for membership of the new section and members of the industry who are contemplating a visit to South Africa are invited to notify the local branches of their intention.

The addresses of the honorary secretaries are as follows:

Johannesburg: F. C. Moore, A.I.R.I., Durham Raw Materials, P.O. Box 4142, Johannesburg.

Durban: A. J. Robertson, P.O. Box 1515, Durban, Natal.

Port Elizabeth: W. Pickup, A.T.I., A.I.R.I., P.O. Box 3062, North End, Port Elizabeth.

The Itshide Rubber Co. Ltd., Petersfield, Hants, announces the appointment of Mr A. A. Gray as L and G representative in South East Kent and Sussex. Mr Gray succeeds the late Mr R. G. Barnes in this area.

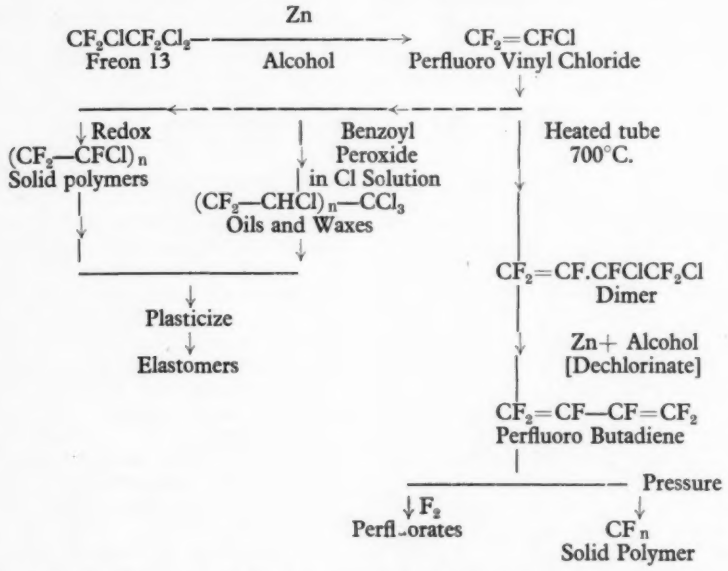
Fluorine-Containing Polymers*

REPLACEMENT OF HYDROGEN OR CHLORINE

GREATER thermal stability in plastic materials was now being sought. Things were moving much faster and therefore getting much hotter. Thermal stability was the main object in polymer research at Birmingham. There was already on the market a material known as Teflon (Fluon) or PTFE which was extremely inert chemically. Although the quantity sold was small, its value was considerable, being estimated at 60m. dollars for the year 1956.

Every known plastic could be paralleled with fluorine replacing hydrogen or chlorine, but it would be a long time before all the necessary work could be carried out. Partial replacement could give unsuitable molecules, but, as the hydrogen was replaced, chemical and thermal stability increases. It was obviously best to work with unsaturated compounds, for example polythene which was paralleled by PTFE. Other dienes may also be used.

Teflon (Fluon) was analogous, but here chlorine replaces some of the fluorine. One general scheme for the manufacture of fluorine polymers



started from Freon 13 and could be tabulated as above.

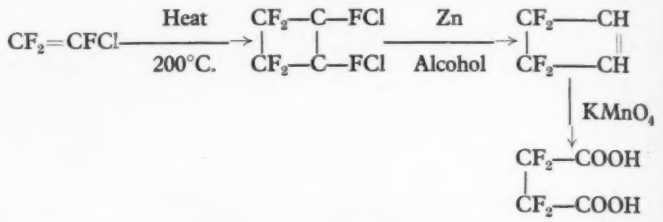
A second system which had not so far been successful commercially was as below.

Polyesters and polyamides could also be modelled with fluorine replacing hydrogen, but the CF_2 groups gave instability to alkali, so that work in this direction had not so far had commercial success. Straight chain fluorine-containing alcohols had been made and, by epoxide chemistry, polyethers. These had potentially good properties, but had not yet been used. A non-inflammable adhesive based on a fluorinated epoxide was not as good as the unfluorinated epoxide.

Fluorine polymers might be boiled with sulphuric acid, potassium permanganate, potassium bichromate and even nitric acid, without effect. In fact, for analysis it was necessary to fuse the sample with sodium or potassium. When super heated, products such as 'Zero Mist' of the Minnesota Co. were obtained; this was used as a wetting agent and it remained stable in an electrolytic plating bath. Professor Hazeldine at Manchester had made a polynitroso compound of the structure

$$CF_2—CF_2—N—C—\ —$$
$$\qquad\qquad\quad |$$
$$\qquad\qquad\quad C—F_3$$

This was obtained from fluoro-nitroso-



methane together with an ethylenic compound, but had not yet been obtained commercially.

Acrylates

Acrylates may be considered as a kind of rubber. The Minnesota Co. had made a poly-hepto-fluoro-butyl butyrate which was rubbery and could be vulcanized. At Birmingham, compounds had been made based on acrylates. The thermal stability was lower than that of PTFE, but they were rubbery and a kind of vulcanization could be achieved. Developments were awaited.

Copolymerization was a useful field and Dr Stanley Dixon had produced a copolymer of $CF_2—CF=CF_2$ and $CF_2=CH_2$ which was being sold by Du Pont Co. under the name of Viton A. This rubber-like material was extremely stable to oxidation and chemical attack and would withstand temperatures as high as 250 to 300°C. for short periods.

Polymers containing chlorine and fluorine (vinylidene fluoride) were likely to succeed in the field of rubber; they could be cured by gamma radiation. Polymerization could also be brought about by gamma radiation. It could also be achieved by alementary fluorine, a trace of which would in fact polymerize almost any known monomer. The reaction was often too fast and the fluorine had to be diluted by nitrogen in order to slow it down.

Fluorine and silica

Manufacturers had tried to combine polymers of fluorine and of silica and there had been at least one success, Silastic 1553, a fluorine-silicon compound of basic structure $CF_3—\overset{|}{\underset{|}{C}}—\overset{|}{\underset{|}{C}}—$

* *Report of a lecture given by Professor M. G. Stacey, F.R.S., (University of Birmingham) to the London District Section of the Plastics Institute, on January 20 1959.*

how time flies!

JUPITER, suckled by a goat whose horn is now the symbol of plenty, became lord of heaven and, it follows, proprietor of the thunder and the lightning. Now the upper atmosphere rends with the sound of aircraft. No word of complaint has yet reached Farnborough. It seems doubtful that Jupiter is still master of all he surveys. So we also hope to be forgiven for introducing the cornucopia as a symbol of the service which, since 1910, Dunlop has given to aviation. A long association with designers and manufacturers has resulted in a plentiful supply of Dunlop equipment essential to the safety and efficiency of the world's leading aircraft. Included are tyres, wheels, brakes, 'Maxaret' anti-skid units, pneumatic actuating systems, de-icing and windscreen wiper equipment, anti-g suits and an endless series of the components, accessories and materials necessary to both civil and service aircraft. Thus Dunlop contributions to both industry and humanity seem also to have no end.

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This had given good elasticity even at low temperatures and the selling price of about £15 per lb. did not prevent its use. The chemical possibilities here were unlimited and other polymers might be developed, for the idea of introducing fluorine into silicones was a good one. CF_2, however, did not give polymers which would withstand the required temperatures of 600 to 700°C.

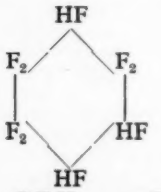
New ideas

Polymers could be made best on cyclic systems. Cyclohexa-enes and dienes had been made. Success in this field had been due to the application by Dr Tatlow of gas chromatography to separate the products obtained by the fluorination of benzene, 22 different compounds having been isolated from what appeared at first sight to be a pure crystalline substance, and there were probably another four or five still remaining which could not be separated, since they made very stubborn azeotropes. The use of gas chromatography which had been developed for analytical purposes had been used for preparation purposes at Birmingham.

Slides showing the dehydro fluorination of nonafluorocyclohexane and 1, 2, dichloro-decafluoro cyclohexane were shown as illustrating how the process would separate substances with very close boiling points.

Fluorination of benzene

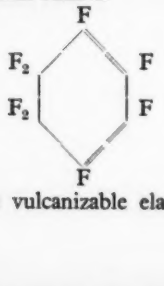
This could be illustrated as follows:



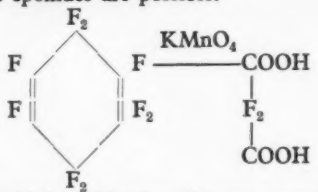
$C_6F_9H_3 \longrightarrow C_6F_{10}H_2, C_6F_8H_4$ etc.
C_6F_{12} (Fully Fluorinated) $\rightarrow C_6F_{11}H$, $C_6F_{10}H_2$ etc.

There were many possible permutations; *cis* and *trans* types were separable by gas chromatography. By removing HF from two molecules a polymerizable monomer was produced. Two or three HFs may be taken out as had been done by the Imperial Smelting Co. working under contract for the Ministry of Supply.

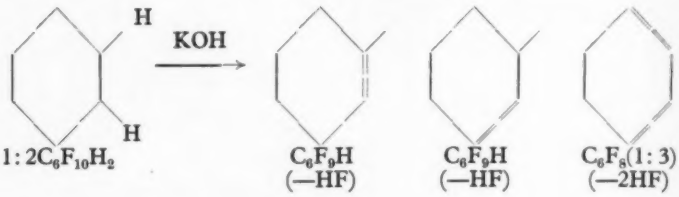
Compounds such as



could give vulcanizable elastomers—ene compounds with one or two unsaturated linkages give elastomers with very high thermal stability. Alkalis give diol and carboxylic acid structures and epoxides are possible.



A high yield of useful compounds could be obtained by modifying the reaction conditions, for example



Once benzene had been obtained the coal tar industry resulted. Now there were fluorine analogues, for example C_6F_6, the analogue of benzene; perfluoro benzene with sodium hydroxide gave the analogue of anisole from which C_6F_5OH, perfluorophenol, could be made and this, with formaldehyde could give resin. C_6F_6 could give a partly fluorinated styrene which could be polymerized.

The greatest future might lie with the perfluoro ethylene copolymers.

Molecular shapes

Fluorcarbons with molecules which had a dumbbell shape, two benzene rings being joined by a chain, $C_6F_{11}(CF_2)_2C_6F_{11}$, are monomeric compounds, but the ends might be changed to cyclohexane types by 'deHFing.' An ene compound was obtainable which may be polymerized. The possibilities were limitless. Two ends might be converted to aromatic end groups. A big future lay in copolymerization. Chlorine or hydrogen or fluorine might be used, giving many compounds. Cl next to CF_2 made the Cl very stable, chlorine also giving solubility. Either way great possibilities by direct fluorination of carbon in nitrogen which slowly burn to give CF_2 and higher products which polymerize.

In almost any reaction involving fluorine some polymers were obtained. The coal mining industry was very interested in such matters.

If it was possible to remove the hydrogen or fluorine by catalyst, aromatic systems could be obtained direct. Carbon or a simple carbon compound could then be employed provided the increased fluorine could be recovered.

A number of specimens were shown to illustrate the unusual frictional and electrical properties of the fluorine polymers. Cyclohexadiene compounds are not affected at all by oxygen; they are rubbery and age well.

CERTIFICATES PRESENTED

Prior to the lecture by Professor Stacey, Dr J. C. Swallow, president of the Plastics Institute, presented certificates to those of the following who were present:

Associate: B. Ellis, D. C. Miles.

Graduate: B. Laxton, G. J. Spickernell, A. Hourd and R. E. Tricket.

Diploma: C. Ayton, W. Adams, R. E. D. Fox, T. G. Freud, T. P. McDonald, F. Moore, J. Morley, R. Robson, W. B. Sisson, R. R. Whisson, J. E. A. Williams, A. R. Woodford, E. Creighton, D. J. Debney, J. O. Frogg, A. J. Kennedy-Ripon, R. Kumarasamy, S. R. D. Oldland, J. Pegram, D. E. Range and J. Tebbenham.

Plastics in Boats

The increase in the number of boats constructed from reinforced plastics notable at the recent London Boat Show was parallelled at the National Motor Boat Show in New York where boats of this type represented about one-third of all vessels exhibited. It is estimated that the American reinforced plastics industry now depends on boats for something like one-fifth of its sales. This would represent about 37m. lb. Sales this year are expected to reach 100,000 hulls, besides which, the US Navy has recently announced that all its boats under 50ft. are now to be made from reinforced plastics.

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IRI LONDON SECTION OCCASION

Annual Dinner and Dance

Among those present at the annual dinner-dance of the London Section of the Institution of the Rubber Industry, held at St. Ermin's Hotel, London, on January 30, were (*left to right*): 1. F. Wilde (Firestone Tyre and Rubber Co. Ltd.) and Mrs Wilde. 2. Mrs F. Starkes, F. Starkes (St. Helens Cable and Rubber Co. Ltd.), R. Bassett (St. Helens), Mrs R. Bassett, H. Lockett (St. Helens) and Mrs Lockett. 3. Mrs L. R. Mernagh, S. J. Breeze (Firestone Tyre and Rubber Co. Ltd.), Mrs Breeze, Mrs Happer, L. R. Mernagh (Firestone). 4. R. H. Sudekum, S. E. Bolam (British Geon Ltd.), Mrs R. H. Sudekum. 5. G. J. Fleming (Anchor Chemical Co. Ltd.), C. H. J. Avons, chairman of the London Section IRI (St. Helens Cable and Rubber Co. Ltd.) and Mrs Avons. 6. J. C. Matthews (Tyresoles Ltd.), Mrs J. C. Matthews, W. C. Miller (Tyresoles) and Mrs Miller. 7. H. Willshaw (Dunlop Rubber Co. Ltd.), Mrs G. E. Holmes-Siedle, G. E. Holmes-Siedle (Secretary, IRI) and Miss M. Willshaw. 8. S. Horobin (Anchor Chemical Co. Ltd.), Miss E. Franklin, Mrs S. Horobin, G. B. Groves (St. Helens Cable and Rubber Co. Ltd.) and Mrs Groves. 9. Dr W. H. Bodger (Revertex Ltd.) and Mrs Bodger. 10. M. W. Waugh (Monsanto Ltd.), C. L. Reid (Monsanto Ltd.), Miss J. Bull and Mrs M. W. Waugh. 11. Mrs F. Moore, Mrs N. C. H. Humphreys, N. C. H. Humphreys (R. W. Greeff and Co. Ltd.), R. Hickson and Mrs Hickson. 12. Mrs P. Glazer, H. E. Austin (Hatcham Rubber Co. Ltd.), P. Glazer. 13. G. F. Brown (Kleinerts Ltd.) and Mrs Brown. 14. Mrs B. C. Manton, Mrs L. D. Spurr, J. Purdey (William Warne and Co. Ltd.), B. C. Manton (Firestone Tyre and Rubber Co. Ltd.). 15. J. R. Cassidy (Mechanical Rubber Co. Ltd.), J. Buxton and Mrs Buxton. 16. Mrs R. H. Rowland, R. H. Craven (IRI), Mrs R. H. Craven, R. H. Rowland (Editor, RJIP). 17. P. Denham, W. Ash and W. V. van Gennep

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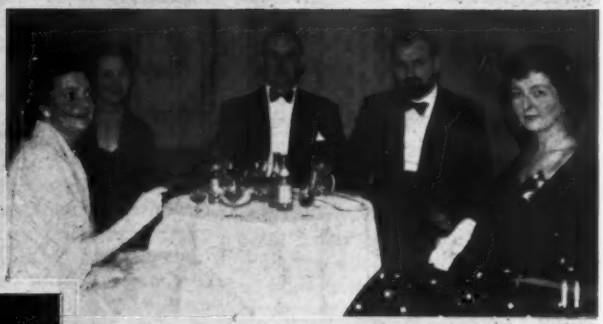
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Properties of Insulating Rubbers

ELECTRICAL PROPERTIES OF HIGH POLYMERS—2

FOR the second lecture of the evening course on the 'Electrical Properties of High Polymers' held at the National College of Rubber Technology on Wednesday January 14 the speaker, Mr Norman, M.Sc., A.Inst.P., A.I.R.I., of RABRM, chose as his topic 'Properties of Insulating Rubbers.'

The theme of this lecture was a description of the associated quantities power factor and permittivity and their ramifications with particular reference to rubbers. Mr Norman commenced with definitions of these quantities, pointing out the confusion in terminology. Power factor could be defined as the cosine of the phase angle between the current and voltage in the case of a condenser, whilst the loss factor was the tangent of the complementary angle. These definitions were those used by electrical engineers, and were not the same as those used by workers in the field of dielectrics. For the latter, the power factor was $\tan\delta$ and not $\cos\theta$, where θ was the phase angle and δ the loss angle, so that $\theta + \delta = \pi/2$. It was obvious that this double terminology could lead to confusion and care should be taken in the interpretation of the symbols. Fortunately, for many rubbers and plastics, the phase angle was large so that $\tan\delta$ and $\cos\theta$ were very nearly the same. By considering a unit cube of the dielectric material, the lecturer showed that the loss factor ϵ'' could be defined by the equation $\epsilon'' = \epsilon' \tan\delta$, where ϵ' was the permittivity of the material.

External Effects

The dependence of the quantities ϵ', ϵ'' and $\tan\delta$ on external effects was next considered. In general both ϵ' and ϵ'' were functions of the frequency, and graphs showing their variation with applied frequency were given. The presence of internal water in the rubber could have a great effect upon the value of ϵ'', in fact about 1/2% of water could increase the value of ϵ'' by more than a hundredfold.

The relationship between the effects of temperature and the measurement frequency upon the dielectric properties was next discussed at length by Mr Norman. This relationship was based upon three assumptions which were made about the individual dipoles producing the dielectric loss. It was shown how these three assumptions lead to the Ferry-Fitzgerald transform. This transform was concerned with the relationship of the mechanical and electrical properties of rubber-like materials. It was to be expected that these two aspects would be related, because they both depended upon configurational changes of the flexible molecules. In general, the transform concerned the response of polymeric materials to small mechanical or electrical vibrations. It had been observed that the response, in either case, was affected equally by an increase in temperature or a decrease in the frequency of oscillation. The method developed by Ferry and Fitzgerald enabled the temperature and frequency scales to be transformed so that the observed properties, whether elastic or dielectric, could be brought to a single curve covering a large temperature and frequency range. This was done with the aid of a standard reference temperature which was not a function of the test procedure but a property of the material only. This temperature was about 50°C. above the glass transition temperature.

Finally the lecturer described the production of a Cole-Cole plot which was obtained by plotting ϵ'' against ϵ' and led to an arc of a circle.

Theoretical Aspects

In general this second lecture of the course dealt with the more theoretical aspects of the electrical properties of high polymers, and of particular interest was the explanation of the Ferry-Fitzgerald transform, which has not yet been dealt with adequately in the published literature. Because of the connexion between the mechanical and electrical properties of the materials which is brought out by this transform, and of the simplification it eventually produces in the representation of data, it is to be hoped that a satisfactory description of it along the lines of Mr Norman's lecture will soon be published.

Mixing Machines for Russia

A RUSSIAN order for more than £70,000 worth of plastics mixing machines has been placed with the Morton Machine Company Ltd., Wishaw, Scotland.

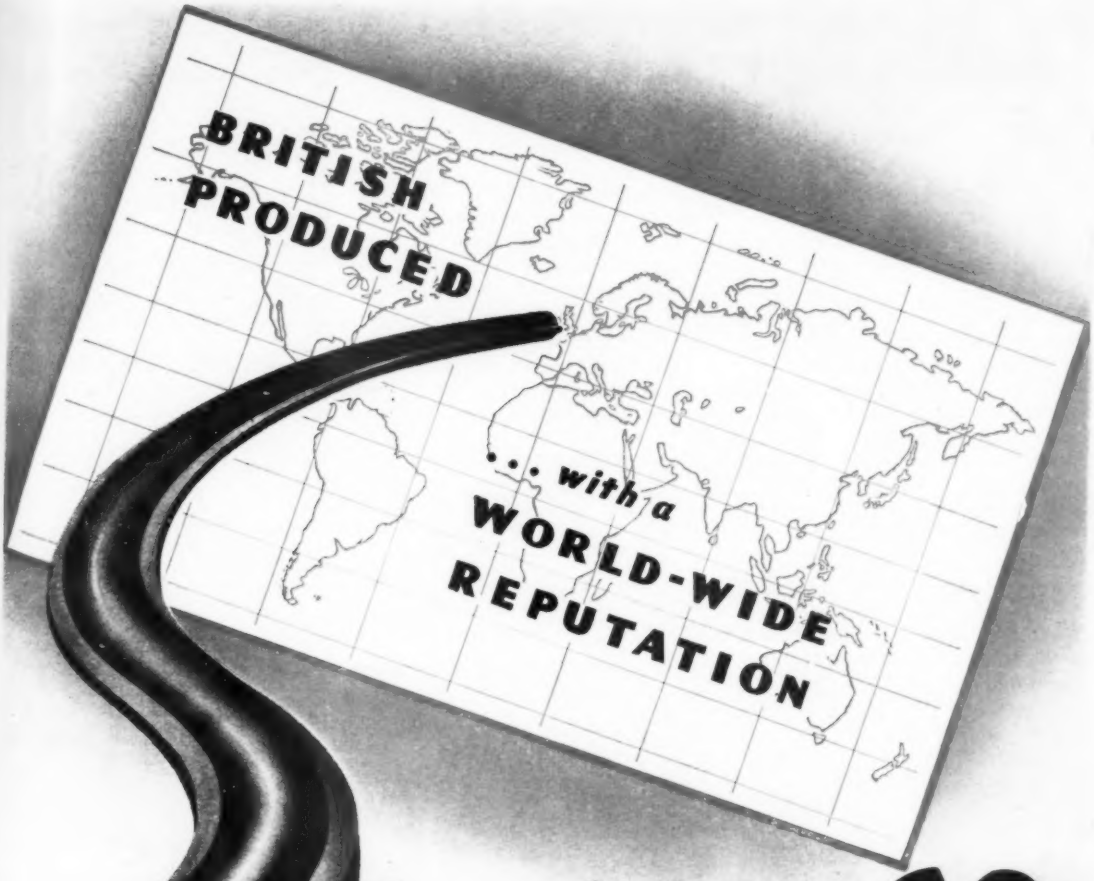
The machines, ordered by Techmashimport, of Moscow, are FKM 300 DK Lodige-Morton mixers for plasticizing plastic powders such as PVC and PVA by the 'dry powder method' or 'dry blend.' Each machine will handle 500lb. of plasticized powder per hour and as it is fitted with twin barrels, can discharge continuously, directly into the feed hopper of an extruder.

The machine consists of an upper circular mixing vessel jacketed for steam at 300°F. Inside this, double plough shaped shovels rotate on a shaft. Attached to the doors of this upper vessel, which is filled to 60% capacity, are perforated plates. The shovels revolve between these plates, picking up the mix and rubbing it through the holes in the perforated plates. In this way polymer, stabilizer and fillers are accurately mixed. While this mixing is taking place the materials are being heated and dried by means of the steam jacket on the outside. The drying takes place quickly since the whole drum is covered by the jacket and the materials are in violent agitation. Plasticizer is added in thin streams during heating process and, on completion, the dry blend is discharged to the lower jacketed vessel through a transfer tunnel. This lower drum also has mixing shovels and serves to cool the mix or maintain it at a reasonably average temperature for continuous feeding to an extruder or into containers. Further plasticizer or colours can be added in the lower cooling vessel. The mix in all cases, discharges as a fine dry powder or granulate.

The Russian order includes a number of pre-heated plasticizer containers for use with the mixers.

Fablon Advertising Campaign

A national advertising campaign for self-adhesive plastic sheeting manufactured by Fablon Ltd., Willington Quay, Wallsend-on-Tyne, opened on January 30. The campaign is using national magazines and 15, 30 and 60-second commercials on Television.



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I.C.I. Design Competition

'ALKATHENE' TROPHY AWARD

THE results of the first 'Alkathene' Design Competition were announced at a reception given by I.C.I. Ltd. at the Savoy Hotel, on February 2.

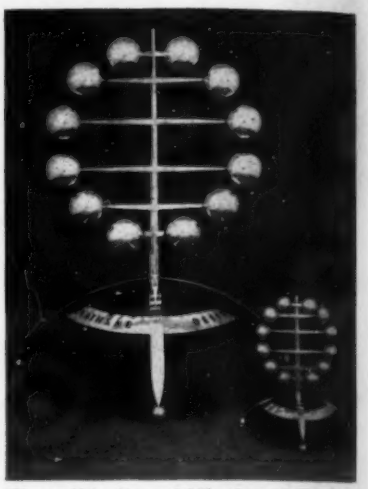
The competition, suggested by one of the leading moulders in the industry, was inaugurated by the I.C.I. Plastics Division to encourage original design among moulders and to stimulate development in the use of plastics. The fine trophy, retained by the moulder of the winning entry, is in solid silver to an original design by Alex Jardine and is hand-made.

Before the awards were made Mr J. V. Crossley, a director of I.C.I. Plastics Division and chairman of the panel of judges, said that there had been 38 entries for this first Alkathene Design Competition. He hoped that there would be 100 next year. The object of the competition was to encourage original design among moulders and to stimulate development in the use of plastics. The panel of judges, he said, had consisted of Mr P. Reilly, deputy director of the Council of Industrial Design, Mr G. E. Mercer, deputy secretary of the Royal Society of Arts, and Mr R. E. Brookes, a member of the Design Committee of the Plastics Institute. Mr Crossley went on to quote some comments made by the judges. Quite a few entries had not had the finish that could have been achieved, some of them still had traces of flash and moulding marks; another criticism had been that too many articles were purely imitative of things produced in other media; too little had been done to try and devise methods of designing articles on the entirely new and novel lines which were now expected.

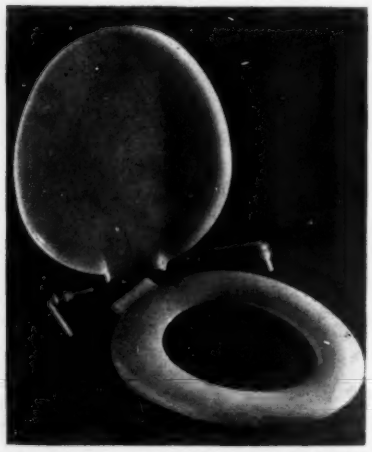
The winning entry was a lavatory seat assembly made by Ekco Plastics Ltd., moulded entirely in Alkathene. With no metal parts, it has a smooth surface top and bottom and no buffers. Fixing to the pan is by means of two 'L' shaped nylon pillars and clamping nuts. The all-enclosing lid is also in 'Alkathene.' A choice of nine colours is available—black, white, corallin pink, primrose, ivory, pastel green, signal red, cornflower blue and lemon peel yellow. The price is 37s. 6d.

Certificates of Merit were awarded to Jury Holloware Ltd., who took second place with a laundry basket retailing at 19s. 11d., including purchase tax, and available in red, green, blue, citron and white, and to Poplar Playthings Ltd., for a medium field gun retailing at 4s. 11d., including purchase tax.

The awards were presented by Dr J. C. Swallow, president of the Plastics Institute, who handed the Alkathene Design Trophy to Mr David Radford of Ekco Plastics Ltd. In addition, the designers of the winning entry, Mr M. O. Rowlands and Mr N. C. Tuppeny, each received a cheque for £25 and were jointly presented with a miniature of the trophy.



The solid silver 'Alkathene' Design Competition trophy to be retained by the moulder of the winning entry, with a miniature for the designer



First prize was won by Ekco Plastics Ltd. for a lavatory seat assembly (*left*), Jury Holloware Ltd. manufactured the laundry basket (*top right*), which won the second prize, and a cap fired toy 'medium field gun' (*bottom right*), complete with shootable 'Alkathene' shells, by Poplar Playthings Ltd., was awarded third prize

FBRAM

TRANSPORT COMMITTEE

MR H. DAVIS, of William Warne and Co. Ltd., has been elected vice-chairman of the Transport Committee of the Federation of British Rubber and Allied Manufacturers. The chairman is Mr P. G. Wilks, of the Dunlop Rubber Co. Ltd., Birmingham.

Mr Davis has been with Wm. Warne and Co. Ltd. for 34 years, and has been transport director of the company since 1948.

New Poly-Punnet

An additional shape and size of Poly-Punnet is now being produced by the plastics group of The Metal Box Co. Ltd. Known as Poly-Punnet No. 2, it is square and measures 4¼in. by 2½in. Injection-moulded in a light, lattice construction from toughened polystyrene, the new punnet will hold 1lb. of strawberries or cherries or other fruits, etc.

US Chemical Sales

Sales of the Hercules Powder Co. last year were $236,500,000, compared with $245,800,000 in 1957. Net earnings were equal to 2.04 dollars per share against 2.14 dollars, according to Mr A. E. Forster, president.

No less than 85% of the world's natural and synthetic rubber is mixed in Banbury Mixers.* Small wonder then, that Bridge-Banbury Mixers, embodying more than a generation of practical experience, research. and machine design, continue to play an almost indispensible part in the rising productivity of the ever-expanding rubber and plastics industries the world over.

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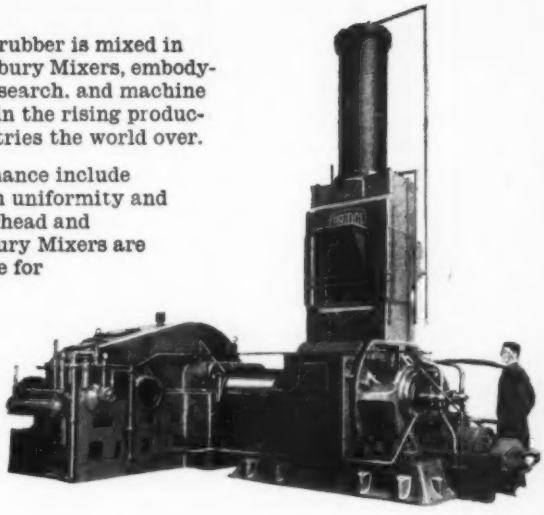

Fully detailed technical information is freely available on request.

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VIEWS and REVIEWS

The Time Factor in Reinforcement

IN a paper the title of which is 'The Colloid Phase Carbon Reinforcement of Rubber' H. A. Braendle, G. L. Heller and J. W. White (Columbian Carbon Co.) have, as a result of recognizing the time factor in colloidal reactions observed that a significant improvement in carbon reinforcement is effected. The brief preliminary summary continues: 'Tread wear improvement of 15% over dry mixing has been confirmed. Further study on the process has revealed unexpected processing advantages. The range of processable carbons has been extended to full SAF' *(Rubber Age,* 1958,84(3),431[1].

Separation of Steps

It is pointed out in the introductory section of the paper that in dry mixing, even on a relatively cool mill, mixing and reaction with the polymer go on simultaneously, but by separating the two steps—'as the Columbian process does—the carbon black can be mixed into the rubber at below-reaction temperatures, and to a uniformity limited only by its insolubility in rubber. By hindsight then, this separation of the mixing and bonding steps together with the superior degree of dispersion account for the interesting and unexpected properties developed in compounds made with Columbian-type rubber.'

The New Concept

[Note: As referred to by the authors, it is recalled that Columbian's studies on the carbon-gel complex *(refs given)* . . . 'show a chemical factor in the carbon-rubber bond.']

In a previous paper by Braendle[2] Columbian Carbon 'announced a new process of masterbatching rubber (specifically *styrene* rubber), carbon black and oil.' This, in itself, was not new, but 'Columbian introduced a new concept, namely, the time reaction between colloids.'

In its simplest terms the Columbian process involves stirring carbon black in water alone under conditions of high velocity, high hydraulic shock and shear, and in the present paper a number of features of the new dispersing machine and other mechanical devices are set out in detail.

There is also an account of the conversion of pilot operation to commercial working. Amongst the interesting features of the subsequent sections are two electron micrographs, the first showing details of high gel hot dry mix tread, and the second a black rubber tread given normal Banbury treatment.

Conclusions

My object, however, in this note is not to go into any elaborate details, but to draw attention to the present paper, the details recorded therein striking me as of more than conventional interest. However, a few of the conclusions reached by the authors may, nevertheless, be mentioned. Thus, apart from the contention that tyre treads of better wearing quality are produced — compared with those made by dry mixing — some other 'unexpected advantages' claimed are:—

(a) The system offers less sensitivity to factory processing variables, both time and temperature.

(b) By separating the mixing and bonding phases of black incorporation into rubber (at least for styrene rubber synthetics), the otherwise deleterious effects of cross-linked, unpigmented polymer are minimized.

(c) The finer, more reinforcing carbons can be used as readily as HAF carbon.

(d) By blending masterbatches of high and low black concentration the number needed to cover the gamut of commercial rubber is reduced to reasonable proportions.

(e) By eliminating dispersing agents, the carbon-rubber affinity or bond is developed to the full.

(f) By accomplishing an otherwise unattainable dispersion of the carbon in the rubber, a more uniform and advantageous distribution of the carbon gel throughout the cured rubber is possible.

The last of the conclusions arrived at by the authors claims that the process has significantly extended the usefulness of carbon black in rubber, since neither the black nor the rubber is subjected to the damage of severe high viscosity milling.

Hevea Yield Records

In the January 1959 issue of the 'Planters' Bulletin' (of the Rubber Research Institute of Malaya) there is an interesting and useful leader on 'Critical Interpretation of Yield Records.' This draws attention to the necessity for critical examination of all yield records and to the dangers of taking them merely at their face value. Yield records, the editorial says, can be presented in a number of different ways, most of which have their particular advantages, and none of which can alone present an accurate detailed picture.

There are two main types of yield record which can be readily recognized: firstly, those from large areas of the rubber—under commercial tappings; and secondly, those from small observation plots or statistically designed trials, the purpose of which is to compare promising new selections.

To look at the matter from a direct practical angle, as set out in the leader:

It would be nonsensical to present the yields of large commercial areas in terms of yield per tree per tapping or per year, since such yields are intended primarily to provide information upon which commercial interests

[1]*Note.*—This paper was presented before the Deutsche Kautschuk-Gesellschaft, Cologne, Germany, May 7-10 1958. It was published in German in 'Kautschuk und Gummi,' September 1958.

[2]Braendle, H. A. 'Improving the Carbon-Rubber Bond,' *Rubber World*, vol. **136,** p.835 (1957).

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

can broadly compare the economical advantages of different fields, planting materials or methods of tapping and husbandry. Yields of a commercial planting depend not only on the inherent yielding capacity of the planting material but also on soil conditions, which may differ markedly within one field, incidence of wind damage and disease, and on every cultural procedure employed. Great accuracy in recording such yields is not required because there are many factors involved, whose effects defy accurate assessment.

Nevertheless, this section of the leader proceeds, 'yields from commercial plantings in the form of pounds per acre per year can be used to make general comparisons of the yield capacity of different planting materials, if a sufficient number of records can be collected from a wide range of districts and cultural conditions.'

The leader quoted extends to over two pages of the *Bulletin*, and seems to me to be well worth close study, particularly as there are a number of points in this problem which may not be quite so simple as may appear at first sight.

Rubber in Roads

The Natural Rubber Development Board has issued under date January 7 1959, *Technical Note No. 3* in the series *Rubber in Road Engineering*. This booklet (14 pp. + 27 references) constitutes a review of Research and Experiment carried out jointly by The Road Research Laboratory, the British Rubber Producers' Research Association, and by the Natural Rubber Development Board, who have for some years been collaborating in research and experiments connected with the use of rubber in road surfaces.

Programme of Research

The research covered by this booklet includes investigations into the effect of rubber on the viscosity and low temperature extensibility of bitumens and sand asphalts; penetration, softening point and brittleness; assessment of rubberized bitumen binders.

Stable Rubber-tar Blends

As an interesting example of the type of work being carried out I now refer—I repeat in exemplification only—to that from 'Rubber in Tar.' It seems that with regard to some previous experiments on the inclusion of rubber in tar, which appeared to give stable compositions, time has shown that the previous conclusions as to stability have been falsified. However, further work has now shown that stable rubber-tar blends may be prepared by using modified rubbers. The two most useful examples of these are chlorinated rubber and methyl methacrylate—natural rubber graft polymer, and an investigation into the properties of such rubber-tar blends is being carried out. However, chlorinated-rubber tars tend to be chemically unstable if the temperature is raised beyond a certain point, evolution of hydrochloric acid taking place. There is also some evidence that cross-linking between rubber and tar occurs leading to a deterioration in the elastic properties of the blend. By keeping the temperature as low as possible these effects can be reduced to a minimum.

With regard to the methyl methacrylate-rubber graft polymer tars little work has so far been done in this respect but it has been shown that such blends are stable at 100°C. and exhibit 'rubbery' qualities.

Notes

The October-November 1958 issue of the *Du Pont Magazine*, from which I recently culled some interesting data regarding nylon, also carries quite a number of other interesting features. For example, '"Dacron" polyester fiberfill.' It appears that this material is now being used in connexion with the production of underwear of remarkable insulation power. About this Tom McDonnell, who directs heavy traffic through a windswept street intersection in Philadelphia, has said that 'last winter was the first time I didn't feel the cold.' The reason for this *cri du coeur* was the appearance of the new polyester fiberfill. In continuation of his report he recalls 'all the other years I had to wear heavy underwear and sweaters, but not this year.' And then Mrs McDonnell comes on the scene, for she added: 'that when her husband put on the insulated underwear he put aside two thick sweaters and a heavy wool shirt.' There is a further advantage as postulated by Mrs McDonnell that the changeover saves a lot in laundry and cleaning in view of the fact that 'I just wash the new underwear and let it drip dry.'

PHILIP SCHIDROWITZ

IFC Investment in Rubber

The International Finance Corporation has agreed to invest 225,000 dollars in a Melbourne company, Rubbertex (Australia) Pty., for expansion of manufacturing operations. The IFC's investment will be in dollar notes bearing interest at 6% per annum, to mature between 1961 and 1970 and redeemable at any time.

Rubbertex—which recently entered into a licensing agreement with Lord Manufacturing Company of Erie, Pennsylvania, will also raise in Australia the equivalent of about 450,000 dollars, at least half of which will come from a public issue of stock—makes, among other things, aircraft, industrial, automotive and medical rubber goods from natural and synthetic rubbers.

French Tyre Prices Up

French tyre manufacturers announced on January 29 that they had raised their prices by an average of 8% to take into account the rise in raw rubber prices due to the devaluation, as well as to higher power and transport charges.

The French Rubber Manufacturer Association also announced that it had examined the impact of a number of tax measures on the price of rubber goods, and that this would mean additional price increases. Each manufacturer will now establish new prices as Government price controls have recently been removed for rubber articles.

Questions Corner—58

(Second Series)

251. Several types of catalysts are used in the manufacture of novolaks and resols. What are they?

252. What considerations would you give to devising control tests for the production of synthetic resin lacquers?

253. Give details of some approximate identification tests for cellulosics.

254. What factors influence the rate and nature of the reaction in the preparation of phenol - formaldehyde resins?

(Answers next week)

Answers to Questions Corner—57

247. Some of the properties of viscose rayon are summarized as follows:

Tenacity. Viscose rayon is reasonably strong with a tenacity of from 2.0 to 3.4gm./denier. The wet strength is somewhat lower (ca.1.0 to 2.0gm./denier) but this does not cause any trouble in washing.

Elongation at Break. This will vary according to the type of viscose rayon, but is generally between 14% and 20% in the dry state and somewhat higher, ca.25% to 30%, in the wet state.

Moisture. In common with other fibres, viscose rayon shows an adsorption and desorption hysteresis depending on the relative humidity. An average moisture content may be taken as ca.12%.

Density. The density of viscose rayon is about 1.5 to 1.53 which is somewhat higher than that of cellulose acetate (1.32).

Chemical. Viscose rayon is attacked by hot dilute or cold concentrated acids to a point of disintegration. Cold dilute acids do not cause a great deal of tendering. Alkalis swell the rayon to a greater extent than cotton and the mechanical properties are reduced. Concentrated alkalis may cause complete disintegration. Generally, organic solvents do not attack viscose rayon which is important for the dry-cleaning of rayon goods.

Biological. Mould and mildew discolour viscose rayon and reduce its strength, but if the size is removed, *e.g.* after scouring and dyeing, the danger of attack is much less. It is not attacked by moths.

Thermal. Viscose rayon is very heat resistant, although if exposed for a long time to a high temperature then degradation and yellowing occur.

Weathering.—The effect of exposure of viscose rayon to sunlight depends on whether it has been pigmented for dulling, or bright. The former will degrade more rapidly than the latter which should be used where prolonged exposure to sunlight is required.

248. When the material from which the fibre is made leaves the jet it is unstretched and the molecules are in a somewhat disordered state. If the fibre is stretched, while cooling, the molecules align themselves in a nearly parallel position to the fibre axis. They also become more crystalline and, because of better packing, interatomic attractive forces have a better chance to exert their influence. When fibres are oriented as a result of being stretched several properties are improved including:

Elongation at Break. The extensibility of the fibre when oriented is relatively low and some of the high tenacity tyres have a very low elongation at break.

Tenacity. Tenacity is an expression of the strength of the fibres and is expressed as grams/denier. Generally, the better the orientation the greater the strength. Those with over 3.0gm./denier are termed 'high tenacity' rayon.

Brittleness. Many fibres become anisotropic by stretching and it may be that a choice has to be made between good strength at the expense of flexibility.

Lustre. Some fibres are quite lustrous but, on the other hand, some are quite dull when spun and only acquire a lustre on being oriented. Nylon is a good example of this.

Chemical resistance. This is improved by stretching, probably because of the denser packing of the molecules.

Dyeing. When a fibre is spun and passes through the jets the molecules in the outside sheath of the fibre are more oriented than those in the centre or core. This effect persists even after stretching and which is responsible for the resistance to wetting. Therefore, the dye will penetrate the sheath slowly and only rapidly when it reaches the core. Also it is not held so fast to the sheath as in the core and thus after printing the colour is removed fairly easily.

* * *

249. Phenol-formaldehyde resins are used extensively as adhesives in the form of liquids, powders, emulsions and films. One of the earliest applications of phenolic resins as an adhesive was the use of phenol-formaldehyde resins, alcohol, monochloronaphthalene and glycerol or castor oil, for sealing the joints of metal pipes (USP 1,065,495). Phenolic resins may also be modified with ethyl cellulose to vary the hardness of the final product. Other cellulosics have been used in the preparation of safety glass (BP 342,337).

Phenolic resin film, using tissue paper as a carrier, can be used for the manufacture of plywood, and is suitable for flat hot pressing techniques. Phenol-formaldehyde resin films have also been tried for bonding metal to wood (Chem. Abs. 1936, *30*, 8430). During the last war phenolic resin bonded plywood was used for aircraft because of its good weathering, mould resistance and moisture resistance.

Water soluble phenolic resins were also used in an attempt to improve dimensional changes in the wood, particularly with reference to the production of wood veneers. Moisture vapour transmission rates of veneers impregnated with phenolic resins was very much reduced in comparison with untreated woods. Fire resistance was also better (Ind. Eng. Chem. 1939, *31*, 897).

* * *

250. Di-n-hexyl phthalate $C_6H_4(COOC_6H_{13})_2$ is a pale oily liquid with a faint odour. It is recommended where heat stability and retentivity are required. It has a low melting point. This plasticizer is a good plasticizer for nitrocellulose giving tough films and flexible films with good stability.

It can be used with ethyl cellulose but it has limited compatibility with cellulose acetate, nevertheless, it has a strong solvent action at elevated temperatures. Used as an auxiliary plasticizer for vinyl resins, it increases calendering and extrusion rates and promotes fast fusion of dispersions. It has been recommended for making expanded products for polyvinyl chloride pastes. In its use for polyvinyl chloride, and co-polymer resins, it imparts high extensibility and low water absorption. Its evaporation rate is lower than that of dibutyl phthalate and is useful as a low temperature plasticizer.

(More questions next week)

Polly Ester

Says . . .

'Calendering is posing for pin-ups!'

MEN *and* MATTERS

A Review of People and Events

by George A. Greenwood

NOT so long ago I was referring to the expansional activities of Universal Metal Products Ltd. of Salford, so well known in the tube and plastics trades. Now comes the interesting news that the company is this year celebrating its silver jubilee, and the occasion of its works party a week or two ago was used to begin its observances, for then gold watches were presented to those of the employees who have had 25 years of uninterrupted service. This, I gather, was only the beginning. Further steps are now being considered for marking this jubilee year, and they should be notable.

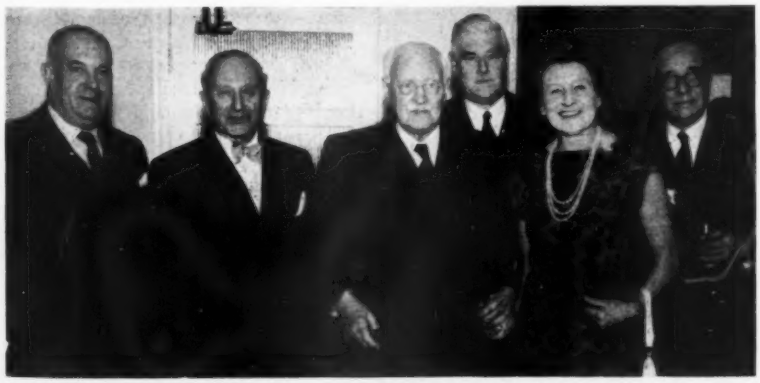
Universal Metal Products Ltd. was formed in 1934 by Mr E. G. Wertheimer for the manufacture of tin and lead collapsible tubes, and commenced production with a few machines and a handful of employees. The company is a wholly owned subsidiary of the Winterbottom Book Cloth Co. Ltd., and Mr Wertheimer is the managing director and also a director of the parent company.

Its history is almost part of the more recent history of plastics. The origin of the extensive plastics division was the demand for plastic tube caps which some time ago started to replace metal closures, and there had been continuous and steady development from the beginning. Mouldings are to be found in many thousands of homes in this country today in the form of components in washing machines, refrigerators, suction cleaners, etc., and are used extensively in industrial equipment. It has an important research and development department, resulting in a first-class customer service department.

New FBRAM Appointment

A position to FBRAM (Federation of British Rubber and Allied Manufacturers) has been created and a well known and interesting personality has been appointed to it. The post is that of vice-chairman of the Federation's Transport Committee, and for it his colleagues have selected Mr H. Davis who for the past 34 years has been with William Warne and Co. Ltd., for a little more than ten years its transport director, based at Barking. The chairman of the committee is Mr P. G. Wilks, of the Dunlop Rubber Co. Ltd. at Birmingham, and the election of Mr Davis should mean a lessening of the strain upon Mr Wilks, and a reduction of his increasingly frequent visits from the Midlands to the Metropolis.

Mr Davis, born in North London 50 years ago, now lives in Ilford, and apart from a couple of years which he had in the City after leaving school as what he himself calls 'senior office boy,' with a shipping export firm, he has been with Warnes ever since 1925. He was in the accounts section until 1928 and when considerable part of the administration was moved to Barking, to be within the area of production, he was within a few months put on shipping export work. Apart from these responsibilities he was for several years head buyer, a responsibility he held until a few months ago, alongside his responsibilities for ten years as transport director. He has now been connected with the Federation for about ten years, and his help and co-operation, always readily given, have been appreciated by all his colleagues. A family man with a wife and three daughters and two grandchildren, his main interest outside the domestic circle is football, and he is a keen follower of the fortunes of the Spurs. Otherwise, he finds very little time for personal pursuits, for he sits also on the Traders' Co-ordinating Committee for Transport, and he is a member of the Ilford and District Transport Group Committee.



At the Universal Metal Products Annual Works Party *(left to right):* **Mr N. B. Punfield (Punfield & Barstow Ltd., chairman, British Plastics Federation), Mr E. G. Wertheimer, managing director of U.M.P., Mr M. Brickhill, chairman, Winterbottom Book Cloth Co. Ltd. and of U.M.P., Mr H. Brickhill, deputy chairman, Winterbottom Book Cloth Co. Ltd. and of U.M.P., Mrs E. G. Wertheimer, Sir Harold Webbe, C.B.E., M.P. This is the Silver Jubilee of the Company**

The New Kleemann Move

In accordance with rumours, or perhaps one should say forecasts, prevailing over the past three or four weeks, it was officially announced at the week-end that O. and M. Kleemann has entered into an agreement with the US Industrial Chemicals Company, a subsidiary of the National Distillers and Chemical Corporation of America, for the sole representation and distribution in the UK of its polythene resins, sold under the name of Petrothene.

The resins will be distributed by Erinoid, the Kleemann subsidiary which will be stocking a wide range of these resins at its Welwyn Garden City distribution centre.

Special grades of petrothene resins are made for film, injection moulding, coating, cable and wire covering and bottle blowing.

Many people in the industry see in this new link-up the likelihood of much more collaboration between plastics and allied undertakings on each side of the Atlantic, and in this event the promotion of sales would not, of course, work in a one way direction.

Return from Space

It is no mere odd coincidence that industrial and scientific discovery and

application are going on side by side, for one thing more or less depends upon and influences the other, as the Duke of Edinburgh is never tired of pointing out to us. This is a little preliminary to some intriguing conjectures regarding the use of plastics

Mr G. K. Hampshire (*left*), **chairman of I.C.I.'s General Chemicals Division, and Dr J. S. Gourlay, chairman of the Paints Division, who, as announced in these columns last week, have been appointed to the board of I.C.I. Ltd.**

in man's efforts to conquer space, which have reached me from those concerned in the Dusseldorf Plastics Exhibition in the autumn. At least, intriguing to me and perhaps to others who will be going to Dusseldorf and to the International Plastics Exhibition at Olympia in June, and other exhibitions elsewhere.

The point made is that the best chances of success lie in the use of stereo-specific plastics in rockets, and now I find myself enmeshed in some tricky speculations and deductions. Most of us will agree that sooner or later a rocket will reach the moon and return to earth. It is common sense, too, that the real issue is whether the first space traveller will return safely in order to tell us what it has all been about. I have always understood that no conventional material can normally withstand the terrific heat which has been and is being generated in these efforts.

For what is now offered as a solution I quote from material in front of me. It says:

'Synthetics experts have found an ingenious solution to the problem. They say that the surface of the moon rocket should be made of a hardening synthetic resin reinforced by mineral fibres. The heat produced will then not be conducted to any significant extent and the outer surface will be gradually burnt off. But as this burning off is a comparatively slow process the inner parts of the rocket will be protected from damage during its few minutes' travel through the atmosphere when the synthetic material will be able to withstand the extreme heat for such a short period.'

Now that is all most interesting and illuminating, and I see no reason to dissent from the logic applied. At the same time it would be only fair to add that I have not yet booked a seat in the rocket which will make the first attempt under human auspices, but that should not deter others, and it is no argument against the ingenious solution which our German friends advance.

In a more serious vein I would add that these exhibitions will be of great importance in showing to all of us the nature and extent of international advances in the plastics field. Science is universal or should be and this is one way in which, without cutting one another's throats, we can work together and share the knowledge which the men and women of research are able to reveal.

Licensing Agreements Sought

I note with interest that Mr Henry Kremer, the chairman and managing director of the Microcell Group, and Dr W. D. Scott, who has just joined the Microcell board, flew to New York on Sunday in connexion with two licensing projects. One of these is to negotiate licensing agreements for the manufacture of microcell products, which include glass fibre rocket launchers in the United States, and the other is concerned with the completion of arrangements for the manufacture of American electronic equipment under licence in Britain.

Rubber Soled Football Boots

I was amused to learn at the weekend of the use by the Arsenal football team in their cup replay against Colchester, of translucent rubber compound soled football boots. Arsenal inform me that these boots were manufactured and supplied by George Ward (Barwell) Ltd., Barwell, near Leicester. The boots—developed with the co-operation of Mr George Swindin, Mr Tommy Docherty, the management of the Arsenal Football

Club, and, in connexion with the composition of the sole, Mr B. J. Vezey, of the Avon India Rubber Co. at Bridgend—were originally designed for training purposes, but they turned out to be ideal for match play on hard ground, as Arsenal's 4—0 win clearly proved. The boots consist essentially of a soft leather upper onto which is moulded a ribbed pattern rubber compound bottom. The accelerated unvulcanized stock from which the soles are made is supplied by the Avon India Rubber Co., and George Ward (Barwell) Ltd. vulcanize and prepare it themselves. The latter company tell me that they are now 'manfully' trying to meet the demand for these boots which has arisen since the Arsenal/Colchester match.

A party led by Mr Karol Fabris, Polish vice-minister of mining and power, paid a visit to the Wellingborough, Northants, factory of Rubber Improvement Ltd., recently. The visit, part of a fortnight's tour of the British mining industry and its allied industries, included inspection of the company's conveyor belt manufacturing department, and other rubber and plastics production sections. (*Left to right*) **Mr W. Kolar, export agent for the Polish coal board, Mr J. Burns, general manager RIL, Mr A. Bem, managing director of coal export for the Polish government, Mr John Lewis, chairman RIL, Mr Fabris, Mr M. Puritz, technical director RIL, and the firm's deputy managing director, Mr M. Sumray**

A New Issue

A fortnight ago I referred to the new share issue which is contemplated by the Leyland and Birmingham Rubber Co. Ltd. and, not having any official notification, I relied upon what was being said in one or two of the national newspapers. It is now pointed out to me, however, that the proposal of the directors for a share bonus issue is in the proportion of two free shares for every three held, and *not* two free shares for every one, as reported. I am only too happy to make this correction, so that any misunderstanding may be removed.

Mill Installation

News from Leyland, Lancashire, is that 'Iddons' have now completed a twin set of 22in. x 60in. mills mounted on fabricated steel bedplate supported on Vibro-insulators. These mills are now in full production and a feature of the installation is that they

Continued on page 214

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Institution of the Rubber Industry

REPORT ON THE 1958 EXAMINATIONS

(Concluded from January 31 issue, page 178)

RUBBER TECHNOLOGY II

Works Practice

On the whole the answers this year were not up to the standard of those of last year. There are still candidates who do not read the questions with sufficient care, and some omit giving mixing composition details, even when these are specifically requested. In the answer to Question 2 a candidate volunteered the information that he would prefer to be a works manager rather than a rubber technologist. Others wrote in the first person, quite evidently not having gained benefit by earlier tuition.

In general, candidates preferred questions which involved writing down memorized facts and avoided those that involved some thought and the organization of facts such as Questions 6 and 8. Where such questions were answered it was obvious that clear conception was rarely present and that digestion of the facts was very incomplete.

Q. 1. *Give a brief description of how latex is obtained from the tree and its subsequent treatment and transportation to the consumer.*

This question seemed a very popular one and was, in fact, answered by nearly every candidate. Some omitted to illustrate their answers and therefore did not get the full benefit of the available marks.

Q. 2. *Assuming that you were appointed as rubber technologist in a small rubber works making moulded articles list, with comments, the testing instruments you would require.*

It would have been thought this would be the most popular question in the Paper but, surprisingly enough, this was not the case. Some candidates included vulcanizing presses as testing instruments, and most made a big point of having an abrasion-testing machine for evaluating the compounds they were likely to produce. It would appear that the shortcomings of abrasion-testing equipment were not fully appreciated.

Q. 3. *Describe the manufacture of* one *of the followirg articles: (a) rubber conveyor belt, (b) 'Wellington' boot (gum boot or knee boot), (c) bonded engine mounting.*

Outline simple formulae for rubber compounds required and indicate the conditions necessary for vulcanization.

This question provided ample opportunity for a candidate to describe some of the well-known processes in the rubber industry. On the whole the questions were well answered, particularly the one dealing with rubber conveyor belting. Only a few tackled a bonded engine mounting, but those who did attempt it generally scored good marks.

Q. 4. *Describe the manufacture of an ebonite battery box or an ebonite tank lining.*

This was not a popular question, but nevertheless it was answered quite well.

Q. 5. *Give a brief description of the principal properties and uses of vulcanizates from six types of synthetic rubber.*

Answers to this question were very mixed and some candidates are evidently not clear as to the difference between a synthetic rubber and a thermoplastic resin since several quoted PVC and high styrene resin as synthetic rubbers.

Q. 6. *In designing a compound for a new application, indicate the factors which you would consider in deciding the type of polymer, kind of reinforcement and rate of cure.*

Not a popular question and poorly answered. Candidates had obviously not given much thought to designing a new compound or the factors that influence compound design.

Q. 7. *Give a brief description of the principles of a calender and its operation including details of recent improvements.*

A popular question handled by the majority in a mediocre way. Some candidates quoted roll contouring as a recent improvement and few have any clear conception of the reasons for the various types of calenders.

Q. 8. *Indicate the difficulties that arise in vulcanizing thick rubber articles and the means that may be adopted to overcome them.*

An unpopular question poorly handled with few candidates having any clear ideas on how to obtain an even state of cure in a thick article.

Q. 9. *Write brief notes on the uses in the rubber industry of* five *of the following: (a) zinc isopropyl xanthate, (b) light calcined magnesia, (c) tricresyl phosphate (tritolyl phosphate), (d) ebonite dust, (e) ammonium oleate, (f) litharge.*

A popular question, for the most part well done.

A. COOPER.
J. W. DENSON.

RUBBER SCIENCE—A

Chemistry

The standard of the candidates' English and their knowledge of examination technique seem to have improved over past years. There is still, however, the candidate who is unable to spell even simple words, the candidate whose grammar is poor, and the candidate who imagines that he can compensate for his lack of knowledge by his ability to fill page after page with meaningless circumlocutions.

Q. 1. *Outline two methods each for preparing typical primary aliphatic and aromatic amines.*

What classes of organic compounds can be used for antioxidants in rubber?

(41 answers.) This question was designed to test the candidates' knowledge of elementary organic chemistry and the simple application of basic principles to rubber compounding. It was not well answered, only three candidates being awarded more than 75% of the possible marks.

Q. 2. *Outline the reactions leading to the formation of three chemical derivatives of natural rubber which are of commercial value, and indicate the uses of the products.*

(75 answers.) A very popular question but not answered fully by most candidates. Those who knew how to prepare three chemical derivatives of natural rubber did not list in full their commercial uses; some omitted the second half of the question entirely.

Q. 3. 0.5402*g. of an accelerator gave on combustion* 0.9962*g. of carbon dioxide and* 0.1413*g. of water.* 0.435*g. of the same substance gave* 31.6 *cc. of nitrogen by Dumas' method (measured dry at* 20°*C. under a pressure of* 753*mm.). In an analysis for sulphur by the Carius method,* 0.6321*g. gave* 1.770*g. of barium sulphate. Using the atomic weights* $C=12$, $H=1$, $O=16$, $S=32$, $N=14$, $Ba=137$, *suggest the probable identity of the accelerator which contains a ring structure (*1*g. molecule of nitrogen at N.T.P. occupies* 22.4 *litres).*

(72 answers.) A calculation is always a popular question and it is usually easier to earn high marks than with an essay question. Surprisingly, however, the average mark obtained for this question was not very much greater than that for Questions 2 or 4. Common errors included the supposition that the molecular weights of hydrogen and nitrogen are 1 and 14 respectively. Even when the correct empirical formula had been obtained, there was still room for error; the Examiner is

still puzzled by the insistence that the accelerator, stated to possess a ring structure, was TMT!

Q. 4. Describe the electronic basis of three kinds of chemical valency, giving two examples of compounds containing each type.

Discuss the characteristic physico-chemical properties of either neoprene or butadiene-acrylonitrile rubber in the light of the chemical structure of the rubber selected.

(22 answers.) Another question whose purpose was to test knowledge of fundamental chemistry. It appears to have been avoided by most candidates but, of those who did attempt it, 50% gained over half marks, and the average mark was slightly above that for Question 2.

It is interesting to note that the two questions which dealt with more fundamental matters were poorly answered. A knowledge of elementary chemistry is required by the syllabus, and Rubber Science is surely the paper in which this should be tested.

S. H. MORRELL.

RUBBER SCIENCE—B

Physics

The number of insufficiently prepared candidates presenting themselves for this examination was smaller than in 1957, and it was encouraging to find good marks being obtained by a large percentage of candidates; this, however, can be traced to the correct calculation of arithmetical riders.

Q. 5. State Ohms Law and define the temperature coefficient of electrical resistance.

An electrical vulcanizing unit is required to provide an output of 500 watts from a supply of 250 volts. If the operating temperature of the heater coils is 600°C. calculate their resistance at 20°C.

Describe a circuit suitable for measuring their resistance at 20°C.

(Assume the temperature coefficient of resistance of the winding to be 0.002 per °C.)

(68 answers.) In general, the answers to this question were reasonably well done and a satisfactory proportion of the candidates gave very good answers.

Q. 6. Describe briefly the principles of the following three processes which are used to heat rubber: (i) dielectric heating, (ii) radiant heating, (iii) electrical resistance heating.

Describe an application of each of these forms of heating in the rubber industry and indicate reasons for the choice of method of heating.

(21 answers.) Of the relatively small number of candidates who attempted this question, only two gave answers of adequate quality. In most cases the answers were woolly and lacked simple understanding of the processes involved.

Q. 7. Define viscosity. On what factors does the viscosity of a rubber solution depend?

The times of flow of two liquids of density 0.797 g.cm.$^{-3}$ and 0.879 g.cm.$^{-3}$ through an Ostwald tube viscometer were 21.2 seconds and 41.5 seconds respectively. In a falling ball viscometer the viscosity of a liquid of density d through which a ball of density D falls freely is given by

$$\eta = k\,(D - d)\,t$$

where k is a constant and t the time of fall between fixed marks. If the time taken for a steel ball of density 7.830 g.cm.$^{-3}$ to fall through a given height of the first liquid is 33.4 seconds, how long will the same ball take to fall the same distance through the second liquid?

(87 answers.) A very popular question. It was encouraging to find that the arithmetical rider was usually well done.

Q. 8. Describe briefly the important changes in physical properties which occur when vulcanized rubber is exposed to low temperatures and indicate how they are affected by the kind of rubber.

In a low temperature torsion test the rigidity modulus is calculated from the approximate expression

$$G = \frac{4L}{WT^3} \cdot \frac{180}{\pi} \cdot \frac{M}{\alpha}$$

Calculate the rigidity modulus for a test piece in which L = 10 cm., W = 1.0 cm., T = 0.4 cm. and which gave a deflection d of 25.5 degrees for a torque M of 1,750 grm. cm. wt.

(81 answers.) Another popular question. A misprint of 'a' for 'd' in the rider did not appear to have disturbed many candidates.

L. MULLINS.

MEN and MATTERS

Continued from page 210

are rock steady along the entire length of the line, even when the plug-in braking is operated. This successful design points the way to more extended applications of this form of mounting. I gather that further details will appear in the Journal later. Interestingly enough, it was in 1950 that Iddons mounted a new 22in. x 60in. mill on Vibro's believed to be the very first rubber mill to be fitted on Vibro-insulators. It is still giving entire satisfaction after 9 years' production.

Rubber Retirement

Mr George A. Williamson, M.I.Mech.E., director of engineering of Firestone Tyre and Rubber Co. Ltd., retired on January 30 1959. He served an indentured apprenticeship at John Anderson, engineers, and North Eastern Marine, both of Newcastle, and started his career as draughtsman with Broom and Wade and plant layout draughtsman at The British Thomson-Houston Co. Ltd., Rugby. From 1913 to 1928 he was plant engineer with The British Thomson - Houston Co. Ltd., at Willesden. During the First World War he served on the staff for Engineer Services (Wireless Section) and was mentioned in despatches.

Mr Williamson joined Firestone in February 1928 as chief engineer, and has conducted all building constructions and equipment installations for Firestone on the Great West Road. He was appointed director of engineering in 1953.

Australian Petrochemical Plant

American and Australian capital will finance a four-unit petrochemical plant in Australia, it has been announced in New York by the Standard-Vacuum Oil Co. Representing more than 50m. dollars of new industrial expansion for the Commonwealth, the project involves four separate units to be located near Melbourne. Among the end-products will be polythene, polystyrene and GR-S-synthetic rubber. Construction will start almost immediately and it is expected that the plant will be in production by mid-1961.

Standard - Vacuum's Australian affiliate, Vacuum Oil Co. Pty. Ltd. will build and operate the key unit, producing ethylene and butadiene from selected petroleum hydrocarbons processed at Stanvac's Altona refinery near Melbourne. Union Carbide Corporation's Australian affiliate will build a polythene unit. Another chemicals company, still to be formed, will build a styrene producer. Both will be adjacent to Vacuum's petrochemicals unit, which will supply them with ethylene.

Styrene and butadiene will be used to make GR-S-synthetic rubber in a fourth unit. Companies manufacturing tyres in Australia will be invited to participate in this unit. The Commonwealth would continue, however, to import natural rubber from the rubber-growing areas, the announcement said.

Change of Address

Fablon Ltd., manufacturers of self-adhesive plastics, have moved to new offices at 49 Park Lane, London, W.1. Their new telephone number is HYDe Park 2155.

Electrical Aids in Industry *Data Sheet* **No. 8**

Light-Sensitive Cells

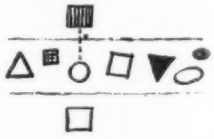
What are light-sensitive cells? They are devices which can sense and measure changes in the level of light or, in some cases, respond to the quality of light falling on them. There are various types of cell and each has its particular field of use. One of the best known is the photo-electric cell.

What can light-sensitive cells do? A change in the amount of light falling on the cell can cause a switch, relay or counter to operate. Alternatively, the direct indication of the light intensity can often allow some other factor to be determined and, if required, controlled. They are reliable and require little maintenance. Careful installation, as with all types of equipment, gives a good reward.

How can they be used? These cells have many applications in industry, for controlling processes, for inspection and measurement, for sorting material and for safety purposes:

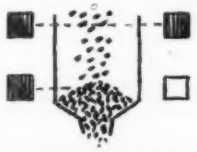
Counting

Where objects on a conveyor belt are too soft or light to operate a direct mechanical counting device, where they are too delicate or freshly painted to sustain physical contact or where the articles vary in size, a light-sensitive cell can be used. This counts the objects by interruption of an appropriately sited beam of light.



Hopper or Tank Level Control

Many forms of feed can be accurately controlled by light cells. One important one is for controlling the input to a hopper of fluid solids such as sand or peas. Here, two horizontal light beams are required: the upper, when interrupted, indicates that the hopper is full and stops the supply; the lower, when it ceases to be interrupted, indicates that the hopper is nearly empty and restarts the flow.



Package Content

The level of powder in packages can be checked with light cells. The cell is so positioned that when the

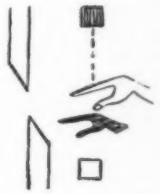
powder is up to the required level, the light reflected from the surface of the powder is picked up by the cell and causes the carton to be accepted. If not, it is rejected.

Colour Sorting

The quality of many articles can be gauged by their colour—seeds and nut kernels, for instance. The objects are fed into a tube by means of a vibrator pan and fall into the beams of three equally spaced light cells which scan them from all sides. If the object is acceptable it falls into a chute carrying it to one conveyor; if its colour is bad it is deflected as a reject.

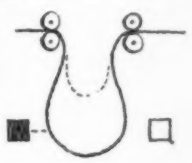
Guillotine Guard

Light cells for guarding a guillotine or power press should be used only as a supplement to a mechanical guard or where the latter is impracticable. The interruption of a curtain of light by a hand stops the machine instantaneously.



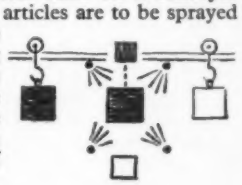
Press Feeding

Where the rate of feed of strip metal must be suited to a varying speed of acceptance by a press, a loop of the strip is allowed to sag between the feed and the press. When the loop reaches a predetermined depth a light beam is interrupted and the slack is taken up.



Processing Objects on the Move

Many articles are processed while on a conveyor line. For instance, where articles are to be sprayed while on the conveyor, the paint saved by stopping the gun between articles will make the device worthwhile. The same principle applies in a bakery to the spraying of baking tins with fat.



Automatic Door Opening and Closing

Doors can be caused to open or close by the interruption of a beam of light. This has its uses in such cases as control of doors on a heating oven or for the passage of vehicles in a factory. This is effected by a light beam on the side from which the approach is made (in many cases, both). When the approach beam is interrupted it opens the door which closes again after a given time interval.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association.

An excellent series of reference books are available (8/6 or 9/- post free) on electricity and productivity — "Higher Productivity" is an example. E.D.A. also have available on free loan a series of films on the industrial uses of electricity. Ask for a catalogue.

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Sisal as Reinforcement

USE IN PLASTICS

AS long ago as the early 1930s, British patents were taken out covering the use of sisal as a plastics reinforcement. It was realized that the contour of the sisal fibre made it most suitable for plastics reinforcement. The re-entrant portion tends to hold the plastic securely and to prevent fibres from slipping out of their position in the matrix. The increased adhesiveness of the plastic mix is thus enhanced with a strengthening of the reinforcing action.

Basic information about sisal and an outline of its properties and uses as a plastics reinforcement medium are contained in a booklet published by Irish Ropes Ltd. Sisal, the leaf fibre of the plant Agave Sisalana, is cultivated widely in British East Africa, Portuguese, East and West Africa, South and Central America, Haiti and Indonesia. Some of its properties are quoted as follows (the figures in general refer to British East African fibre):

Fibre fineness	.. 200–400 denier
Fibre tenacity	.. 4.0–6.0 gms./denier
Elongation	.. 2.5%
Energy absorption	60×10^{-3} g.cm./cm.de ɪ.
Modulus of elasticity	.. 330 gms./denier
Fibre density	.. 1.5 (density of fibre substance) 0.81 (apparent density of fibre)

Advantages, compared to conventional glass fibre, are given as:

a. Lower cost.
b. Lower specific gravity.
c. Higher impact strength.
d. Longer shelf-life of the mix in the case of polyester premix compounds.

The disadvantages noted are:

a. Low flexural strength and modulus.
b. High water absorption.
c. Lower tensile strength.

It is stated in the booklet that the normal length for the chopped fibre is either $\frac{1}{4}$in. or $\frac{1}{2}$in. (although the range is $\frac{1}{8}$in. to 8in.). Of these, the $\frac{1}{2}$in. length gives greater flexural strength in the final material but the $\frac{1}{4}$in. is often chosen for the better flow characteristics it gives the dough and for the decreased danger of mats of fibre forming.

In addition to the chopped form, sisal is also available in a variety of woven forms. These can vary in weight from $1\frac{1}{2}$oz. per sq. ft. for a very open scrim type, up to 6oz. per sq. ft. for a closely woven material of heavy yarn. One cloth for plastics reinforcement is a thin cloth ($\frac{1}{16}$in. thick) of such close weave that there would be no big pockets of reinforced resin. It weighs about 3oz. per sq. ft.

Graphs, giving the properties of a series of polyester mixes which contain, as a reinforcement, glass and sisal fibres in different proportions, are included in the booklet which has sections also on cost, availability of the fibre and ratings for mouldability, handleability and appearance.

Canadian Tyre Production

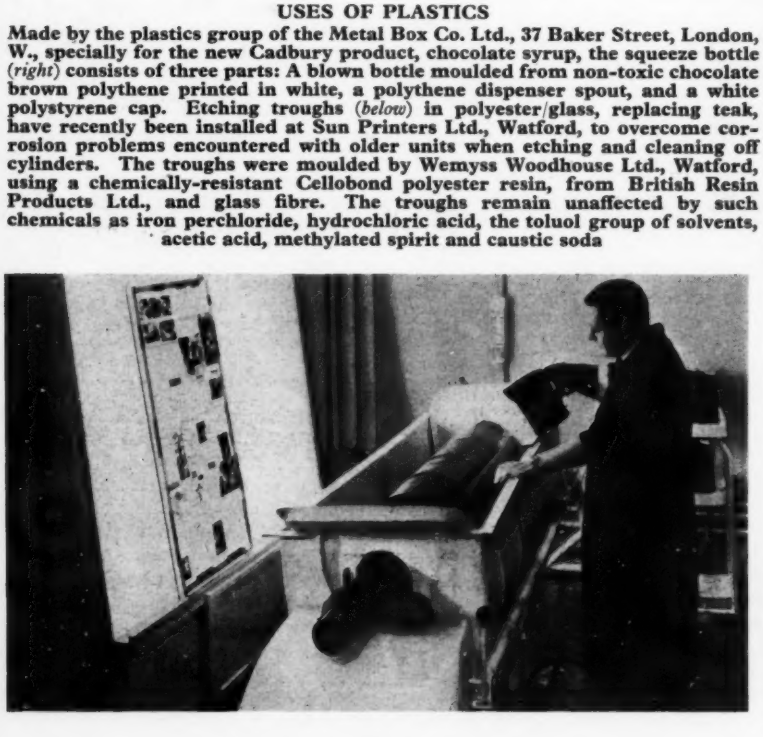
The Rubber Association of Canada reports that Canadian production of pneumatic tyres in November 1958 amounted to 754,723 units, an increase of 6% compared with 710,227 units the previous month, and a rise of 15%, compared with 656,022 units in November 1957. Total production for the first eleven months of 1958 was 7,045,893 units, 3% less than the 7,292,401 units produced in the corresponding period of 1957.

Total sales for the eleven months, January - November 1958, at 7,410,198 units were about 1% higher than sales of 7,335,338 units in the same period year before.

Mr H. Kremer has joined the board of BTR Industries.

USES OF PLASTICS

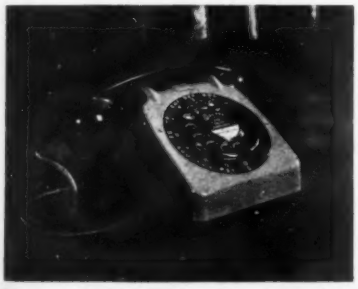
Made by the plastics group of the Metal Box Co. Ltd., 37 Baker Street, London, W., specially for the new Cadbury product, chocolate syrup, the squeeze bottle (*right*) consists of three parts: A blown bottle moulded from non-toxic chocolate brown polythene printed in white, a polythene dispenser spout, and a white polystyrene cap. Etching troughs (*below*) in polyester/glass, replacing teak, have recently been installed at Sun Printers Ltd., Watford, to overcome corrosion problems encountered with older units when etching and cleaning off cylinders. The troughs were moulded by Wemyss Woodhouse Ltd., Watford, using a chemically-resistant Cellobond polyester resin, from British Resin Products Ltd., and glass fibre. The troughs remain unaffected by such chemicals as iron perchloride, hydrochloric acid, the toluol group of solvents, acetic acid, methylated spirit and caustic soda



I.C.I. Diakon Exhibition

AT the I.C.I. 'Diakon' exhibition in London on January 27 and 28 there were two features of particular interest to manufacturers of plastic materials. The first is a technique developed by the I.C.I. Plastics Division for the continuous extrusion of polymethyl methacrylate (Diakon). This has opened up a big new market for the material, particularly in the extrusion of lighting covers and similar components for use with fluorescent tubes. It is, however, not possible to use commercially every type of extruder for this purpose.

Diakon is fed into an extruder as a 'rigid,' which softens only to a highly viscous melt, requiring the use of an extruder of especially robust construction, particularly with regard to the thrust bearing assembly. Slow screw speeds are also required in order to eliminate the possibility of depolymerization. It is recommended



The new GPO telephone is of pleasing appearance and very light in weight compared with the conventional telephone

in addition that the length/diameter ratio of panels should be ideally 20:1 to give a greater area of heat transfer. There are other factors with regard to extrusion, all of which, if taken into account, result in the very fine example of extruded section as shown at this exhibition.

The second feature of interest is the GPO telephone (*1*). This instrument is extremely light in comparison with an ordinary phone and of pleasing colour and polish, both of which features are maintained over long periods of time, an asset claimed by I.C.I. in selling Diakon against certain other plastic materials.

The fact that the GPO has chosen Diakon for the new pattern coloured telephonic instruments is important considering the plastics materials that have been tried. Also, the price of Diakon has been recently reduced to 3s. 6d. per lb. as against 5s. per lb. previously, bringing it nearer to such competing materials as polystyrene, at a standard price of 2s. 7½d. per lb.

Other interesting examples of applications of polymethyl methacrylate (Diakon) were among the 173 ex-

A magnifying lens illustrating the clarity that can be obtained with 'Diakon'

hibits. It is not possible to mention all of these but the magnifying lens (*2*), made by Combined Optical Industries Ltd. was of particular interest in demonstrating the clarity that can be obtained from this material. Also of interest were the cable junction box components made by Lustroid Prestware Ltd. From the illustration the precision obtainable with Diakon can be seen. A speedometer dial made for Vauxhall Motors by E. K. Cole Ltd. showed the effectiveness of figure printing on perspex. The distributor caps made by Lester Plastics Ltd. (*3*), from clear Diakon gave some indication of the mouldable properties of the material. A novel example of the use of Diakon was emergency sea lights made by McMurdo Instrument Co. Ltd., these being constructed to operate in salt water.

To summarize, the exhibition, although small, gave a clear and useful demonstration of the many and

Distributor caps made in 'Diakon' by Lester Plastics Ltd., give some indication of the mouldable properties

varied modern applications for polymethyl methacrylate and from the number of people who attended, has obviously proved of real interest to many in the plastics industry.

PERMALI LTD.

The latest range of 'Dialam' SRBP bushings designed to the new CEMA / NEMA specifications, a glass-fibre air baffle of an expanded-core design, and other 'Permaglass' items, including several intricate dough moulded insulators, will be on show at the stand of Permali Ltd. at the forthcoming Electrical Engineers Exhibition. Examples of 'Permali' densified wood laminates to be exhibited are alternator brackets, arc control pots, lift bars, stay-wire insulators and tap-changer switch parts.

Emphasis will be given to loaded components in the 'Permaflon' PTFE display, the company having made a special study of this process. Developments in the use of cast resin for electrical insulation parts will be seen in the range of 'Permacast' components, such as bushings, coated bus-bars, multiple spout insulators, stand-off insulators, potted windings and encapsulated coils.

Goodyear's Staff Changes

The Goodyear Tyre and Rubber Company announce that Mr R. J. M. Perrett, previously district manager, Wolverhampton, is transferred to the post of district manager, Birmingham. Mr Perrett joined Goodyear in 1936 and has worked in various sales capacities. Mr B. C. Colson is transferred from Sales Development Division, Wolverhampton (head office) to the appointment of district manager, Wolverhampton, in the Midland Division. Mr D. F. Towers has been appointed district manager (Nottingham). Mr Towers joined Goodyear as a salesman in the Midland Division in 1954.

Rigidex for Housewares

A number of housewares made from Rigidex polythene made by British Resin Products, have been on show at the International Hardware Trades Fair, Olympia, this week. Twelve leading manufacturers are now using this material for a wide variety of uses, ranging from kitchen mixers to baby baths and fuel hods.

A spokesman for B. F. Goodrich Company in New York said recently that the plant in Melbourne, Australia, in which B. F. Goodrich International has a major interest, would produce only tyre and industrial rubber products. The plant would not make any synthetic rubber.

Rubber Statistics

WORLD POSITION AT THE END OF NOVEMBER

THE latest Press release issued by the Secretariat of the International Rubber Study Group brings the world rubber position up to the end of November 1958. The following preliminary figures, which are expressed in 1,000 long tons, show the natural rubber position at the end of November, compared with the position at the end of November 1957.

NATURAL RUBBER

	Nov. 1958	Jan./Nov. 1958	Jan./Nov. 1957
Production	167.5	1,662.5	1,730.0
Consumption:	167.5	1,802.5	1,740.0

Stocks at November 30:	Change since Jan. 1 1958
In producing areas ..	277.5 + 5.0
In consuming areas ..	217.5 – 40.0
Afloat	225.0 + 2.5
	720.0 – 32.5

The Study Group points out that the figure of 1,662,500 tons for natural rubber production during these eleven months includes data for Indonesian exports and that these are not complete. This goes some way towards explaining why, during recent months, the natural rubber production figures have been consistently below those for consumption, suggesting a world-wide shortage of natural rubber which has not been borne out by current movements in the price. Stocks have been declining during these months, particularly in consuming areas, where there has been a 40,000-ton reduction; at the same time, however, there have been slight increases in stocks in producing areas and afloat.

Imports into Russia and China

The natural rubber consumption total for November includes estimated imports into Russia of 13,750 tons and into China of 10,000 tons, making a total of 23,750 tons for these two countries or about one-seventh of the month's natural rubber consumption total. Up to the end of November imports into Russia had totalled 182,500 tons and those into China had totalled 132,500 tons, their combined total of 315,000 tons representing nearly 18% of the total amount of rubber consumed during these 11 months. Last year's imports into these two countries during the same period totalled 72,800 tons and 105,500 tons respectively, or 178,300 tons in all, representing about one-tenth of total world natural rubber consumption.

Synthetic Rubber

The synthetic rubber position, as compared with that during the first 11 months of 1957, is set out in the following table:

SYNTHETIC RUBBER

	Nov. 1958	Jan./Nov. 1958	Jan./Nov. 1957
Production:	117.5	1,092.5	1,145.5
Consumption:	110.0	1,107.5	1,162.5

	Change since Jan. 1 1958
Stocks at November 30 ..	255.0 – 12.5

In the case of synthetic rubber, the 1958 totals have remained well short of those for the preceding year, both in production and in consumption. Stocks of synthetic had fallen by 12,500 tons since the beginning of the year.

United States General Position

The United States Department of Commerce has issued the following preliminary statistics for the month of November. The figures are in long tons:

NATURAL RUBBER

Consumption:
43,101 tons of which latex 6,540 tons
Stocks:
74,969 tons of which latex 8,795 tons

SYNTHETIC RUBBER

	Production	Consumption	Stocks
S-Type..	84,382	65,883	140,673
Butyl ..	4,145	4,419	20,192
Neoprene	10,394	6,211	15,373
N-Type..	3,575	2,500	7,273
	102,496	79,013	183,511

Total new rubber consumption during November amounted to 122,114 tons and brought US consumption up to the end of November for natural and synthetic rubber combined to 1,225,013 tons. The total for the first 11 months of 1957 had been 1,359,051 tons, the 1958 total thus representing a decline of some 10%. Natural rubber accounted for 35.30% of the total amount of rubber consumed during November compared with a percentage of 35.74 in October.

Indonesian Exports

The Study Group states that reported exports from the Republic of Indonesia during November amounted to 59,439 tons, compared with the previous month's total of 59,440 tons, estate rubber accounting for 16,680 tons of the total and smallholders' rubber for 42,759 tons. Exports from Indonesia during November 1957 amounted to 45,130 tons. Total reported exports from Indonesia during the 11 months ended November 30 amounted to 503,328 tons, the published figure for exports during the comparable period of 1957 having been 614,496 tons.

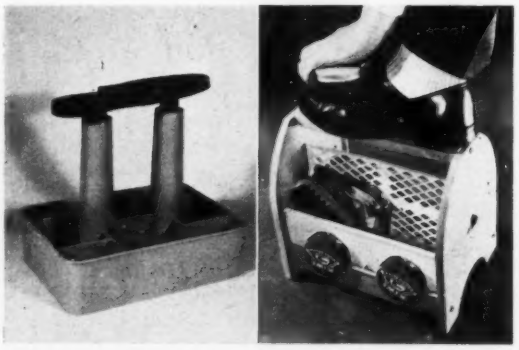
Correction

In last week's Rubber Statistics the total of natural rubber production for January/October 1957 was given incorrectly as 1,632,500. This should have read 1,575,000.

'Unilux' Price Reductions

Price reductions for Unilux translucent sheeting have been announced by U.A.M Plastics Ltd., with effect from February 2.

Typical of the reductions, for 5ft. Unilux sheets, in normal and fire retardant grades, are (previous prices in parentheses): Standard 3in. profile, grade A, 51s. 8d. (60s.); grade FR, 65s. 10d. (70s.). New plant has made possible the introduction of Unilux flat sheet in widths up to 4ft. in any practicable length and in any colour, translucent or opaque. The price for Grade A flat sheet is 3s. 6d. per sq. ft., 4s. 6d. for Grade FR.



Designed so that a shine may be put on any shoes quickly and with the maximum of ease, the 'shoe shine boy,' *left*, is the latest addition to the 'Plexene' polythene plastic range made by the Hermes Supply Co. (London) Ltd. and will be shown for the first time at the Hardware Trades Fair this year. It is available in four colours: red, blue, green, and yellow, with a black foot rest, and retails at 14s. 11d. The shoe cleaner box, *right*, with a built-in foot-rest to aid cleaning, is now being manufactured by Ferrers Precision Co. Ltd., Higham Ferrers, Northants. Made with tough, lightweight Styron 475 polystyrene and available in red, green, light blue or yellow two-tone, this box retails at 15s. 11d.

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The ANALYSIS of RUBBER AND RUBBER-LIKE POLYMERS

☆

R.A.B.R.M. MANUAL No. 3

By WILLIAM C. WAKE
M.Sc., Ph.D.(Lond.), F.R.I.C., F.I.R.I.
HEAD of CHEMISTRY DIVISION
RESEARCH ASSOCIATION of BRITISH RUBBER MANUFACTURERS

THE first modern work devoted solely to this important subject to be published in the English language. In addition to the analysis of natural and synthetic rubbers, the author deals with rubber-like plastics such as Polyethylene, PVC, PVDC, PVA and Urethanes. Also discussed are the identification of compounding ingredients used in the manufacture of rubber and rubber-like polymers.

It will unquestionably become a standard work and is a "must" for all analysts interested in this subject.

CONTENTS:

Extraction Procedures - Qualitative Analysis for Polymer Type - Elemental Analysis of Extracted Polymer - Direct Determination by Functional Group Analysis - Solution and Dissolution Methods - Quantitative Cracking and Distillation Methods - Carbon Black in Rubber - Ashing, Wet and Dry, and the Determination of Trace Metals - Analysis of Extracts and Blooms - Statistical Aspects of Analytical Work.

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PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 3s. 6d. per copy (including postage).

Hollow Reinforced Plastic Articles

No. 802,713. O. V. Plym. Application and Filed, November 29 1956. Application in Sweden, November 29 1955. Published, October 8 1958.

The invention relates to a method and apparatus for making tubes and other hollow articles of fibre-reinforced synthetic plastics in which a fibrous web or fabric is applied to a flexible carrier, as of paper, the web being coated or impregnated with a liquid plastic before, during or after application to the carrier.

According to the invention, an inflatable bag or hose of a material such as rubber is applied to the fibrous web and the longitudinal edges of the carrier are brought together in order to cause the carrier and the web on it to encircle a cavity in which the hose is inflated. The inflated hose presses against the walls defining the cavity and causes the plastic to penetrate into the web and form a tubular shell with it. The plastic is solidified by curing, with or without heating, and when the layer of plastic and fibres has solidified to a sufficient extent, the hose is deflated and withdrawn or it may remain within the finished article. The process avoids the use of permanent moulds and thus reduces the cost of manufacture of hollow reinforced plastic articles.

Adhesive Compositions

Nos. 804,201-3. Dunlop Rubber Co. Ltd. Inventors: D. W. Sear and A. P. Osborne. Application, July 5 1954. Filed, June 24 1955. Published, November 12 1958.

These Specifications relate to adhesive compositions based on rubbery copolymers of butadiene and methyl isopropenyl ketone. The copolymers are admixed with different classes of materials to produce the adhesive compositions according to the particular Specifications as follows:

804,201 — An incompletely condensed phenolic resin. 804,202 — A cellulose derivative. 804,203 — A polyvinyl resin or chlorinated rubber. The polyvinyl resin may be PVC, polyvinyl acetate, polyvinyl acetals or copolymers of vinyl esters.

Fillers and/or curing agents may be incorporated and the compositions are dispersed in a volatile organic solvent. The adhesive compositions are easy to process and possess a high bond strength. They may be used for bonding surfaces of wood, leather, plastic, glass and metal. Examples of formulations are given in all three Specifications.

Latex Foam Rubber

No. 804,208. The B.F. Goodrich Co. Application and Filed, May 30 1956. Application in USA, June 8 1955. Published, November 12 1958.

Latex foam rubber having a uniform cell structure and uniform density is made by gelling a frothed latex by diffusing a chilled gaseous material containing a coagulating acid gas through the froth at atmospheric pressure while the latex is in the fluid (unfrozen) condition. The gaseous material may consist of 10 to 25% by volume of carbon dioxide (the coagulating acid gas) and the remainder air and it may be at a temperature between −10° and −20°C. Other coagulating acid gases which may be used are sulphur dioxide, hydrogen chloride, hydrogen sulphide and acid-forming nitrogen oxides.

The process may be used with natural rubber latex or a synthetic rubber latex. The examples relate to the use of natural rubber latex, SBR latex, neoprene latex and a mixture of natural and SBR latices.

Hydrocarbon Polymers

No. 804,079. Monsanto Chemical Co. Application and Filed, June 1 1956. Application in USA, June 2 1955. Published, November 5 1958.

Ethylene and other hydrocarbons are polymerized in the presence of a known catalyst prepared by the interaction of an organic aluminium compound with a halide of titanium or zirconium. According to the invention, the catalyst is destroyed, after completion of polymerization, by heating the reaction mixture to 90° to 105°C. with an excess of alcohol over that required to react with the catalyst. By this means, a white or pale coloured polymer is obtained in contrast to the highly coloured polymers hitherto obtained with catalysts of the above kind.

The examples relate to the preparation of polythene, polystyrene, polybutadiene, a butadiene-styrene copolymer and a butadiene-ethylene copolymer.

Systemic Herbicide Compositions

No. 803,772. The British Rubber Producers' Research Association. Communication from E. D. C. Baptist and P. de Jonge. Application, August 3 1954. Filed, July 29 1955. Published, October 29 1958.

The invention relates to compositions suitable for the treatment of rubber-bearing hevea for the stimulation of yield and/or bark renewal. The compositions include a lower alkyl ester of 2,4,5-trichlorophenoxyacetic acid, in which the alkyl group contains up to five carbon atoms, dissolved in vegetable oil or a mixture of vegetable oil and palm oil sludge or a mixture of vegetable oil and mineral grease. The compositions are not capable of dispersion in water.

In an example, the normal butyl ester of 2,4,5-trichlorophenoxyacetic acid as a 1% solution in palm oil was applied at monthly intervals for a period of four months to newly-tapped bark above the tapping cut. The average yield of dry rubber over this period was doubled as a result of application of the yield stimulant.

Shorter Abstracts

Polythene Compositions. 803,557. Petrochemicals Ltd. Filed, December 27 1956.—Organic phosphites are claimed as antioxidants for low-pressure polythene. Preferred phosphites are trilauryl phosphite, trioctyl phosphite, and certain aryl phosphites.

Joint Ring. 803,997. Pneumatiques et Caoutchouc Manufacture Kleber-Colombes. Filed, January 14 1955.—A joint ring for gas mains has a body of natural rubber and a facing of nitrile rubber where the ring is in contact with the gas. The facing is attached to the body of the ring with a neoprene adhesive.

Plasticizers. 804,057. Monsanto Chemical Co. Filed, September 5 1956.—Compounds claimed as plasticizers for PVC and vinyl chloride copolymers are esters of 2-ethyl-4-methyl-2-pentenoic acid, 2-ethyl-4-methyl-2-penten-1-ol or 2-ethyl-4-methyl-1-pentanol having from 10 to 45 carbon atoms and containing only carbon, oxygen and hydrogen.

Curing Agents for Polyepoxides. 804,294. N. V. de Bataafsche Petroleum Mij. Filed, April 26 1956.—An adduct suitable for curing a polyepoxide is prepared by reacting an aromatic polyamine with a monoepoxide having a terminal epoxy group, the molar ratio of polyamine to monoepoxide being more than 2 to 1.

Pneumatic Cushion for Vehicle Suspension System. 804,366. The General Tire and Rubber Co. Filed, February 3 1955.—The cushion comprises a plurality of tubular cells disposed flatwise against one another and having integral connexion with one another and/or to rigid top and bottom metal members over a tapered bonding zone. The construction is described in detail with the aid of 39 drawings.

Leather-like Material. 804,669. The B. F. Goodrich Co. Filed, December 15 1955.—A leather-like sheet material is made by impregnating a non-woven fabric, *e.g.* a nylon mat, with a solution of a particular type of polyester-urethane. The impregnated material is dried, allowed to age and then pressed, after which it may be embossed.

Synthetic Rubber Prices

Prices of synthetic rubbers appear regularly in RUBBER JOURNAL AND INTERNATIONAL PLASTICS *in the first week of each month. It will be appreciated if suppliers will give notification of any price changes or additions to their range. Cif duty paid quotations are subject to slight variation due to exchange, ocean freight and insurance fluctuations. Prices are in pence per lb., except where otherwise stated.*

(e-qdp)—Ex-quay duty paid (cifUKdp)—cif UK duty paid (ddp)—Delivered duty paid (e-sUK)—Ex-store UK (d)—Delivered

SBR TYPES AND HIGH-STYRENE RUBBER

Ameripol (Goodrich Gulf) (min., 70,000-lb. lots)	(e-qdp)
1000 Hot, Non-Oil	23.10
1001 „ „	23.10
1002 „ „	23.34
1006 „ „	23.34
1007 „ „	23.34
1009 „ „	23.71
1011 „ „	23.71
1012 „ „	23.24
1013 „ „	23.94
1500 Cold, Non-Oil	23.10
1501 „ „	23.10
1502 „ „	23.10
1703 Cold, Oil-Extended, 25% oil	*20.31
1705 „ „ „ „	*20.07
1707 „ „ 37.5% oil	*18.89
1708 „ „ „ „	*18.89
1710 „ „ „ „	*18.66
1712 „ „ „ „	*18.66

* Under 70,000 lb., min. 600 lb.

ASRC (American Synthetic Rubber Corpn.) (carloads lots of 30,000 lb.)	(cifUKdp*)
1000 Hot, Non-Oil	23.99
1001 „ „	23.99
1004 „ „	23.99
1006 „ „	23.99
1009 „ „	24.61
1018 „ „	26.74
1019 „ „	26.26
1500 Cold, Non-Oil	23.99
1502 „ „	23.99
1503 „ „	26.02
3110 „ „	25.78
1703 Cold, Oil-Extended	20.69
1708 „ „	19.27

* US/£ conversion rate $2.80

Copo (Copolymer)	(cifUKdp)
1006 Hot, Non-Oil	23.25
1500 Cold, „	23.25
1502 „ „	23.25
1505 „ „	26.00
1712 „ Oil-Extended	18.50
1778 „ „	18.75
3900 „ Rosin-Extended	23.125

International Synthetic Rubber Co.	(ex-wks)
Intol 1500	22
Intol 1502	22
Intol 1710	17.5

Philprene (Phillips)	(e-qdp*)
1000 Hot, Non-Pigmented	23.28
1001 „ „	23.28
1006 „ „	23.28
1009 „ „	24.69
1010 „ „	25.86
1018 „ „	26.80
1019 Hot, Non-Pigmented	26.33
1100 Hot, Pigmented	19.65
1104 „ „	19.28
1500 Cold, Non-Pigmented	23.28
1502 „ „	23.28
1503 „ „	26.10
1601 Cold, Pigmented	19.56
1605 „ „	19.28
1703 Cold, Oil-Extended	20.23
1706 „ „	19.94
1708 „ „	18.82
1712 „ „	18.58
1803 „ Pigmntd, Oil-Extended	17.78
1805 „ „ „	15.99

*US/£ conversion rate $2.81½

Plioflex (Goodyear)	(fasUSport US Cents per lb.)
1006 Hot, Non-Pigmented	23.25
1500 Cold, Non-Pigmented	23.25
1502 „ „	23.25
1703 Cold, Oil-Extended	20.00
1710 „ „	18.25
1712 „ „	18.25
1713 „ „	16.9
1714 „ „	16.65
1773 Cold, Oil-Extended, Light-Coloured	20.00
1778 Cold, Oil-Extended, Light-Coloured	18.5

Polysar (Polymer UK)	(e-sUK)
S Hot	22
S630 „	22
Kryflex 200 Cold, for Cables	23.5
Krylene „	22
Krylene NS „ Non-Staining	22
Krynol 651 „ Oil-Extended	17.5
Krynol 652 „ „	17.75
SX 371 Process Aid	24

Shell	(cifUKdp)
S-1000 Hot, Non-Pigmented	24.52
S-1002 „ „	24.75
S-1006 „ „	24.52
S-1013 „ „	25.38
S-1100 Hot, Black Masterbatch	20.06
S-1500 Cold, Non-Pigmented	24.52
S-1502 „ „	24.52
S-1600 Cold, Black Masterbatch	19.97
S-1601 „ „ „	19.97
S-1602 „ „ „	19.97
S-1703 Cold, Oil Masterbatch	21.20
S-1706 „ „ „	20.96
S-1707 „ „ „	19.78
S-1712 „ „ „	19.54
S-1801 Cold, Oil & Black Masterbatch	18.35

Synpol (Texas-U.S. Chemical Company)	(cifUKdp)
1000 Hot, Non-Oil	23.10
1001 „ „	23.10
1002 „ „	23.34
1006 „ „	23.10
1007 „ „	23.10
1009 „ „	23.71
1012 „ „	23.24
1013 „ „	23.94
1061 „ „	23.10
1500 Cold, Non-Oil	23.10
1502 „ „	23.10
1551 „ „	23.10
1703 Cold, Oil-Extended	20.13
1707 „ „	18.71
1708 „ „	18.71
1711 „ „	19.18
1712 „ „	18.48
8200 „ „	18.71
8201 „ „ (50 parts oil)	17.20
8150 Cold, Non-Oil, Black Masterbatch	19.46
8250 Cold, Oil-Extended, Black Masterbatch	17.67
8251 Cold, Oil-Extended, Black Masterbatch	16.11
8253 Cold, Oil-Extended (non-staining) Black Masterbatch	16.20

US/£ conversion rate $2.80

SBR LATICES

Copo (Copolymer) (10-ton lots)	(cifUKdp)
2101 (dry weight)	46.30
X-765 („ „)	40.80
X-800 (dry weight)	37.20
2102 („ „)	38.00
2105 („ „)	38.00
2110 („ „)	38.00

Pliolite Rubber (Goodyear)	(d)
2000	40

Latex	
2001 (dry weight)	40
2104 „ „	40
2105 „ „	40
2108 „ „	40
5350 „ „	40

Pliolite Resin (Goodyear)	(d)
101A (dry weight)	44
150 („ „)	50
151 („ „)	35
160 („ „)	50
170 („ „)	50

Hycar (B. F. Goodrich)	(ddp)
2507 (high styrene) dry weight	48

Polysar (Polymer UK)	(e-sUK)
Latex, type II	38.5
Latex, type IV	32.5
Latex, type 721	33.5

ACRYLONITRILE TYPES

Butaprene N (Firestone)	(cifUKdp)
NL	52.5
NAA	56.25
NF	51.5
NXM	60.18

Chemigum	(e-s)
N—1	75
N—3A	52
N—5	52
N—6G	45
N—7	45
N—8	45
N600X	45

Hycar (British Geon) (500-lb. lots and over)	(UKd)
1001 High Nitrile Hot	52
1041 „ „ Cold	52
1002 Medium High Nitrile Hot	45
1042 „ „ „ Cold	45

Hycar (B. F. Goodrich) (500-lb. lots and over)	(ddp)
1411 High Nitrile (powder)	66
1432 Medium High Nitrile (crumb)	64
1072 Medium High Nitrile (carboxyl)	66
1312 Medium High Nitrile (liquid)	55
1043 Medium Low Nitrile	51
1014 Low Nitrile	61

I.C.I. (min. 5-cwt. lots)	(UKd)
Butakon A-4051 High Nitrile Cold	52
Butakon A-3051 Medium Nitrile High Mooney Cold	45
Butakon A-3002 Medium Nitrile Low Mooney Cold	45

Paracril (US Rubber)	(e-sUK)
18-80 Low Nitrile	63
AJ „ „	50
B Medium Low Nitrile	51
BJ „ „ „	51
BLT „ „ „ Cold	51
BJLT „ „ „ „	51
C Medium High Nitrile	59
CLT „ „ „ Cold	59
CV „ „ „ (crumb)	60
D High Nitrile	67

Polysar (Polymer UK)	(d)
Krynac 800 Medium Nitrile	45
Krynac 802 Low „	45
Krynac 803 Medium „ (low Mooney)	45
Krynac 801 High Nitrile	52

ACRYLONITRILE LATICES

Butaprene N (Firestone)	(cifUKdp)
N-300 (dry weight)	53
N-400 („ „)	60.5

Chemigum Latex (Goodyear)	(d)
200 (dry weight)	65
235 CHS („ „)	60
236 („ „)	60
245 B („ „)	52
245 CHS („ „)	52
246 („ „)	52
247 („ „)	52
248 („ „)	52

Hycar (B. F. Goodrich) (dry weight, 3 drums and over)	(ddp)
1551 High Nitrile (large particle)	66
1552 Medium High Nitrile (large particle)	57

Hycar (British Geon) (dry weight, 3 drums and over)	(UKd)
1561 High Nitrile	60
1571 „ „ (carboxyl)	60
1562 Medium High Nitrile	52
1577 „ „ „ (modified)	

ACRYLIC TYPES

Hycar (B. F. Goodrich)	(ddp)
4021 Slab, 500 lb. and over	144
4501 Latex, dry weight	96

BUTYL TYPES

Esso	(e-sUK)
Regular 035	21.75
Regular 150	21.75
Regular 215	21.75
Regular 217	21.75
Regular 218	21.75
Regular 325	21.75
Non-staining 065	22.75
Non-staining 165	22.75
Non-staining 265	22.75
Non-staining 267	22.75
Non-staining 268	22.75
Non-staining 365	22.75

Vistanex (Polyisobutylene)	(e-qdp)
MS Low molecular weight	54
MH „ „ „	54
L-80 Medium molecular weight	54
L-100 „ „ „	54
L-120 „ „ „	54
L-140 „ „ „	54

Polysar (Polymer UK)	(e-sUK)
Butyl 100	21.75
Butyl 200	21.75
Butyl 300	21.75
Butyl 301 (non-staining)	21.75
Butyl 400	21.75
Butyl 101 (non-staining)	26.25

Hycar (B. F. Goodrich) (500 lb. and over)	(ddp)
2202 Brominated	68

NEOPRENES

	(e-qdp)
W and WHV (dry weight del)	42.62
WRT („ „ „)	48.37
WX („ „ „)	44.62
GN („ „ „)	44.62
GNA („ „ „)	44.62
GRT and S („ „ „)	45.62
AC („ „ „)	57.125
KNR („ „ „)	75.62
AC'M'and'S' „ „ „)	57.125
CG („ „ „)	57.125
AD („ „ „)	57.125

Latices—Dry (per lb. del, min. 50 lb.)	
571	49.75
842A	49.75
572	51.25
601A	51.87
650	54.125
735	51.25
736	51.25
950	58.25
60	51.87
750	51.25
635	53.62

SILASTOMER

Midland Silicones (500 lb. lots del)	
Stocks	16s. 6d. to 35s.
Pastes	26s. to 35s.
Gums and base stock	36s. to 42s.
Cold-curing silicone rubber	20s. and 23s. 6d.

REINFORCING RESINS AND RUBBERS

I.C.I. (min. 2-ton lots)	(UKd)
Butakon S-8551	36.5
Butakon S-7001	33.5

Hycar (B. F. Goodrich)	(ddp)
2007 (powder)	42.5

Pliolite (Goodyear)	(d)
S—6B	36.5

Polysar (Polymer UK)	(e-sUK)
SS-250 (high styrene) (bale form)	27.25
SS-250 („ „) (flake form)	27.5
Kryflex 252 (high styrene)	25.5

Cyclite (Durham Raw Materials)	42

HYPALON

In 50-lb. bags del UK	71.62

1959 Furniture Exhibition

The increasing part which plastics materials are playing in the furnishing of modern homes, has been very evident at the 1959 Furniture Exhibition at Earls Court, London, S.W.5, which closes today (Saturday). The uses of plastic laminates for furniture, and foam for mattress and chair, etc., upholstery, are already widely accepted, but this year's exhibition has presented a great many new applications of these materials—and plastic sheet and synthetic fibres—which, if taken as an indication of future trends in furnishing, foretell a healthy future for the plastics and synthetic fibre industries in this field.

A new range of melamine surfaced furniture, made by J. Berry and Sons, Lea Bridge Road, Leyton, after seven years of research and development, is a good example of the major advance in both design and the use of new materials and production techniques which is being made. The melamine laminates are manufactured by Berry Furniture using high pressure and are applied directly to the wood, blockboard and other surfaces.

An interesting material at the Exhibition is Dralon, a new fully synthetic fibre of Farbenfabriken Bayer Aktiengesellschaft, which is produced on a polyacrylonitrile basis, and another, 'Vynalast,' a new PVC foil with a backing of paper, on the stand of I.C.I. (Hyde) Ltd., has been seen for the first time. 'Vynalast' was featured as a facing and panelling material. Furniture covered in 'Vynide' PVC coated fabric and 'Vynair,' was also shown by I.C.I. An interesting stand is that of Aeropreen Products Ltd., High Wycombe. 'Housewives of the future will be furnishing their homes with holes,' says the company which is exhibiting foam products.

Dunlopillo, Pirelli (resilient webbing), British Nylon Spinners, and Formica Ltd., etc., firms who supply materials widely used for furnishing were well represented and a number of companies, including the following, exhibited furniture employing rubber and plastics materials extensively:

A. Arenson Ltd., Barnet Trading Estate, Park Road, High Barnet, Herts. I. Barget Ltd., Garford Works, Garford Street, Poplar, London, E.14. Beatall Kitchens Ltd., Penhall Road, Charlton, London, S.E.7. Bristow and Townsend Ltd., Desborough Park Road, High Wycombe, Bucks. J. T. Ellis and Co. Ltd., Crown Works, Wakefield Road, Huddersfield, Yorkshire. Essential Kitchens Ltd., Buckingham Avenue, Slough Trading Estate, Slough, Bucks. Hairlok Co. Ltd., Magna Works, Kathie Road, Bedford. Leylux Ltd., Mayfield Mill, Stump Lane, Chorley, Lancs. Parslow Furniture Ltd., Queen's Road, High Wycombe, Bucks. Price Brothers and Co. Ltd., Staplegrove Mills, Wellington, Somerset. Progress Mercantile Co. Ltd., 368 Old Street, London, E.C.1. W. Steel and Co. Ltd., Palmers Road, Roman Road, London, E.2. Guy, Rogers, Ltd., Edwards Lane, Speke, Liverpool, 24. Styles and Mealing Ltd., Ogilvie Road, High Wycombe, Bucks. Vitafoam Ltd., Don Mill, Middleton, Manchester. Jas. Williamson and Son Ltd. (leathercloth division), Lune Mills, Lancaster. F. Wrighton and Sons Ltd., Brampton Works, Billet Road, Walthamstow, London, E.17.

B. H. and G. Appointment

Barrow Hepburn and Gale announce the appointment of Mr W. B. Wailing, A.C.A., as assistant general manager of their belting factory at Mitcham, Surrey, in succession to Mr D. A. Blackman.

Mr Wailing qualified as a chartered accountant in 1953 and after obtaining his commission in the Royal Air Force, joined the Barrow Hepburn and Gale group as a trainee. For the past two years he has been a director of Kitchin and Co. Ltd., Leeds.

Rubber Markets

LONDON

The London rubber market has recovered part of the previous week's losses during the past week. Gains of a farthing per lb. or more have been recorded with the larger rises among the forward positions. The Spot is a farthing up at 25d. per lb. Prices generally fluctuated in sympathy with the movements in Singapore which is higher on balance.

Latest prices are as follows:

No. 1 RSS spot: 24⅞d.-25⅛d.

Settlement House:

March 25d.-25⅛d.

April/June 25⅛d.-25¼d.

July/September 25⅛d.-25¼d.

October/December 25¼d.-25⅜d.

No. 1 RSS cif basis ports:

February 25d.-25¼d.

March 25d.-25¼d.

Godown:

February 84¾ Straits cents nominal.

Latex

Centrifuged latex per gallon in drums, February / March shipment, 14s. 7d. seller, cif European ports. Spot, seller, 15s. 1d. Bulk, seller, 15s. 1d. Creamed, seller, 14s. 2d. Normal, seller, 11s. 3d.

SINGAPORE

The market opened lower on disappointing overseas advices on February 2, and ruled extremely quiet with volume small. Lower grade interest was selective but owing to reserve of sellers little business was concluded. Extremely quiet conditions prevailed during the afternoon with little trading. Lower grades were dealt in sporadically. Factories were interested but with lack of sellers little trading was reported. The close was idle. Afterhours, very quiet conditions continued.

	Straits cents per lb., fob Malayan ports to open ports	
	Close	Previous Close
No. 1 RSS, Feb.	84 —84¼	84¼—84½
March	84⅞—85¼	85⅛—85⅜
No. 2 RSS, Feb.	82½—83¼	83 —83⅜
No. 3 RSS, Feb.	82¼—83¼	82½—83¼
No. 4 RSS, Feb.	81¼—82¼	82 —82½
No. 5 RSS, Feb.	78½—79¼	79 —80
No. 1 Spot	83½—84	83½—84¼
No. 3 blanket, thick remilled, Feb.	77 —79	77 —79
No. 1 fine pale crepe, Feb.	86 —88	86½—88½
Tendency:	Very quiet	

Latex, native produce, 60% centrifugal, packed in rec. drums fob 162.40d. n per gallon.

NEW YORK

The following landed prices ruled in New York on February 2:

Dealers' Prices

	Cents per lb. Feb. 2	Previous
No. 1 RSS, Feb...	29⅛b–29⅜a	29⅛b–29⅜a
March	29⅛b–29⅜a	29⅛b–29⅜a
No. 2 RSS, Feb...	29⅛b–29⅜a	29⅛b–29⅜a
March	29⅛b–29⅜a	29⅛b–29⅜a
No. 3 RSS, Feb...	28⅞b–29⅛a	28⅝b–29a
March	28⅞b–29⅛a	28⅝b–29a
No. 1 RSS, Spot..	29⅛b–29⅜a	29⅛b–29⅜a
No. 3 amber blanket crepe, Feb. ..	27¼b–27½a	27¼b–27½a
No. 1 latex, thin crepe, Feb. ..	30⅜n	30⅛t
No. 1 latex, thick crepe, Feb. ..	30n	29¾n

Futures—Rex Contract

	Close	Prev. Close
March ..	29.85b–29.95a	29.85b–30.00a
May ..	29.95t	29.93t
July ..	29.85t	29.88b–29.93a
Sept. ..	29.90t	29.88b–29.90a
Nov. ..	29.90t	29.88t
Jan. ..	29 90t	29.88t
March ..	29.85b	29.90a

Sales: 17 Tendency: Steadier

Rubber futures were steady in very light dealings on February 2. Traders said that physical market was also quiet, with factory interest negligible. However, shipment offerings were light.

Crepe Rubber

The following prices ruled in New York on January 28:

Dealers' selling prices:	Cents per lb.
Sole crepe, standard grade 'A'	48 (48)
Thick crepe	32⅛ (32½)

AMSTERDAM

The Amsterdam rubber market ruled as follows on February 2:

	Guilders per kilo Feb. 2	Previous
No. 1 RMA		
February	2.42	2.42
March	2.42	2.42
April	2.42	2.42½
May	2.42½	2.42½
June	2.42½	2.43½
April/June	2.42	2.43½
July	2.44	2.45½
August	2.44	2.45½
September	2.44	2.45½

Sales: 30. Tendency: Quiet

DJAKARTA

It was a very quiet session on February 2 with small buying interest noted in No. 1 sheet for ready delivery. Export certificates were quoted at 332 traded with sellers.

	Rupiahs per kilo Feb. 2	Previous
Spot No. 1 Priok ..	22.80b	22.80b
Spot No. 2 Priok ..	21.80b	21.80b
Spot No. 3 Priok ..	20.65b	20.65b
No. 1 fine pale crepe ..	21.40b	21.50b
Tendency:	Very quiet	

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on February 2 was 26.75 (27.00) US cents per lb.

CEYLON

No. 1 RSS

The price for No. 1 RSS, spot, at Colombo on February 2 was 103n (104) Ceylon cents per lb.

ORIENTAL ESTATES AGENCY

The registered offices of Oriental Estates Ltd. and also of the companies mentioned below for which the company acts as secretary, registrars and agents have been transferred to: 19 Leadenhall Street, London, E.C.3. Telephone: Mansion House 9822, as from January 31. The companies are: Badenoch Rubber Estate, Bagan Serai Rubber Estates, Bukit Tengah Properties, The Mountjoy Rubber Estate, Orient Trust, Paloh Plantations, The Rubana Rubber Estates, The Sabrang Rubber Estate, The Straits Rubber Company, Tali Ayer Rubber Estates.

Epoxide Resin

A new grade of epoxide resin (DR 19120) is now being marketed by Bakelite Ltd. This material, with hardener DQ 19121 (phthalic anhydride), gives a hot curing system specially suitable for potting and casting in the electrical industry. The system has a long pot life, low viscosity when molten, and the castings have very good electrical properties which are retained at elevated temperatures. Full details of the system are contained in Advance Information Sheet E.30, copies of which are available on request from Bakelite Limited, 12-18 Grosvenor Gardens, London, S.W.1.

Plastic Reimports

The Customs duty on reimports of plastic sheeting that has been sent abroad for lamination is not altered by a Treasury Order which took effect on February 4. The Order provides that duty shall be chargeable only for the value of the lamination process. This means no change in the present rate, but the Order was necessary to take into account the tariff provisions of the Import Duties Act 1958, which came into effect on January 1.

Industry INTELLIGENCE

Technical Data

Santowhite CI

Santowhite CI is a general purpose antioxidant and copper inhibitor having the chemical name N,N' di-beta-naphthyl p-phenylene diamine. It is practically non-staining and is especially valuable in both dielectric and sheathing compounds for cables. Data showing the effect of Santowhite CI in natural rubber compounds, including latex, are given in Technical Service Bulletin No. 15A/1 issued by Monsanto Chemicals Ltd., Monsanto House, 10-18 Victoria Street, London, S.W.1.

In the work reported, Santowhite CI was added in a proportion of 1 phr to a gum stock, a dielectric stock and a cable sheathing stock, the preservative effect of the antioxidant being shown by accelerating ageing tests. The addition of Santowhite CI had substantially no effect on the electrical properties of the dielectric stock. The copper-inhibiting properties of the antioxidant were demonstrated in a dielectric stock containing added copper contaminant. Santowhite CI offers a good protection to latex goods, its use in a latex foam compound being described as an example. Latex foam containing 1 phr of the antioxidant showed no degradation after ageing for six weeks in an air oven at 70°C. or four hours at 126°C. in air at 60 psi.

Pharmaceutical Bottle Closures of Butyl Rubber

Polysar XPRD-759 is a non-staining, non-discolouring butyl rubber and two recipes for pharmaceutical bottle closures based on this rubber are given in Polysar Technical Report No. 7 : 9B, by W. D. Gunter, distributed in the UK by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4.

The compounds contain 20 and 80 phr of white fillers respectively and were designed to meet the requirements of a particular type of bottle closure which has to be resistant to ageing (a) in superheated water and (b) in contact with dihydrostreptomycin sulphate. Test results are reported and show that the two compounds meet these requirements. Minor adjustments in the recipes may be necessary to meet other requirements for particular pharmaceutical bottle closures.

Nitrile Rubber Compound Resistant to Multi-purpose Grease

Multi-purpose greases are designed so that a single grease can be used for motor cars, goods vehicles, farm machinery, industrial machinery and ships. The evaluation of a normally compounded nitrile rubber stock for use in contact with a lithium based grease of this kind forms the subject of Polysar Technical Report No. 7:9C, distributed in the UK by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4.

Polysar Krynac 803, an easy-processing nitrile rubber, was used for the work, and the compound contained 50 phr of HAF black. Data are given for the physical properties of the unaged vulcanizate and for the changes in these properties after immersion in the grease for 70 hours at 212°F. Results of immersion in ASTM Oil No. 1 are included for comparison. The data indicate that the compound resists attack by the grease quite well and would therefore be suitable for making seals to be used in contact with it.

Machines, Materials and Equipment

Polythene Mouldings by the Engel Process

A number of polythene containers of various forms—tanks and drums, etc.—in sizes ranging from 5 to 200 gallons capacity, are being produced by Rose-

Containers manufactured under the Engel process. A fish box (*left*), 26½ in. x 21 in. x 8½ in. deep, and a shallow textile container, 22 in. x 21 in. x 6 in. deep

dale Associated Manufacturers Ltd., at their Cinderford Works, Gloucestershire, with the Engel Process. With this process, low cost tools are used that produce larger articles than could be conveniently handled by conventional injection moulding machines. With high properties of corrosion resistance and light in weight, containers of this size will find many applications in industry. An advisory service on new applications is being operated at the company's London office, 11, Upper Grosvenor Street, W.1.

Cutting Tool

Designed to cut rubber, plastics, wood or metal, a new hand tool in the form of a file is being manufactured by Stanley Works (GB) Ltd., Rutland Road, Sheffield, 3. The cutting blades in the tool are replaceable and the teeth extend all round the edge so that it will cut into corners and rebates. It is essentially a general purpose tool and will cut nails left in wood as easily as the wood itself. It is claimed that the teeth will not drag or plough even on mild steel. The body is cast in light alloy with a compressed rubber grip moulded on to it. The shape of the toe allows many different finger grips. The blades are held in position in much the same way as in a hacksaw and there is a tensioning screw at the toe. This can be tightened by a coin. Swarf cut from the material passes through the holes behind the teeth and so does not cause clogging.

Publications Received

Terylene for Fire Fighting

The many ways in which Terylene is contributing to modern fire fighting are outlined in a recently issued I.C.I. booklet 'Terylene for Fire-Fighting.' This material, the booklet states, is being used for a wide range of equipment including hoses, safety lines, mooring ropes and coated fabrics for salvage sheets, and protective clothing. In addition, trials are now in progress with Terylene 'Bikini' rafts and portable water tanks.

Level Controller

Full details are given in Fielden Electronics Ltd.'s Specification Sheet PN/1 of the 'Pneutronic' On/Off Level Controller which it manufactures. This mechanism provides an output air pressure suitable for operating a standard pneumatic diaphragm control valve. The instrument can be used for controlling the level of solids or liquids which may be at high temperatures, high pressures or under corrosive conditions. A robust electrode is the only item in the container and there are no floats, pivots, gears, diaphragms, etc., to become clogged or worn. The equipment is fully transistorized and operates from a supply of 12 volts DC.

Industrial Adhesives

The problems which arise in connexion with the bonding of a variety of materials including rubber and plastics, are outlined in 'Special Problems in Bonding,' by the industrial adhesives division at Stafford of Evode Ltd. The qualities of the company's Evo-Stik adhesives and their various applications are presented briefly.

Dust Control

Leaflet No. 60 from Dallow Lambert and Co. Ltd., Thurmaston, Leicester, gives details of a variety of the company's dust control units for industry, and shows, with illustrations, some of the applications of these units.

Export Opportunities

Reinforced Rubber Lined Fire Hose for Burma

The Director General, Union of Burma Purchase Board, St. John's Road, Rangoon (Quotation No. III/108/58-59(H)), has issued the following requirements: 6,000ft. reinforced rubber lined fire hose, plastic-proofed pressure flex, all synthetic fibre weft, cotton warp construction inner lining of cambric reinforced latex. Size 2½in. interior dia. with outlet male and female standard instantaneous. Light alloy hose couplings for each length 100ft. max. working pressure 250lb. psi. Closing date is February 13.

A copy of the tender documents is available for loan at this branch. A photo-copy set can be purchased from the branch for 2s. Board of Trade Reference No.: ESB/2547/59.

Tyres and Tubes for Burma

The Director General, Union of Burma Purchase Board, St. John's Road, Rangoon (Quotation No. IIIA/77/P & M of 58-59), has issued the following requirements: 10 sets of tyres and tubes, 11 x 36, 4 ply; 6 sets, 1400 x 24, 16 ply; 6 sets, 1200 x 24. Closing date is February 16.

A copy of the tender documents is available for loan at this branch. A photo-copy set can be purchased for 2s. Board of Trade Reference No. ESB2553/59.

Tyres and Tubes for France

Supreme Headquarters Allied Powers Europe, Headquarters Command. Purchasing and Contracting Office, Paris, has issued the following requirements: Tyres, 150 each 750 x 14—4 Ply, 75 each 640 x 15—4 Ply; tubes, 50 each 750 x 14, 25 each 640 x 15. Closing date is February 16.

A limited number of tender documents are available upon direct application to this branch. Board of Trade Reference No. ESB/2111/59.

Plastics and Rubber for Western Germany

The firm of A. Petersen, Duisburg, Koenigstrasse 50, have advised the British Consulate-General at Dusseldorf that they wish to get into touch with UK manufacturers of urea and phenolic moulding powder, chlorinated rubber, carbon (gas) black and similar materials.

Manufacturers interested in this enquiry should write direct to A. Petersen and notify the British Consulate-General, Commercial Section, Dusseldorf, Cecilian Alle 16, that they have done so. Board of Trade reference ESB/1990/59.

The address of the Export Services Branch of the Board of Trade is Lacon House, Theobalds Road, London, W.C.1. Telephone number: Chancery 4411, extensions 776 or 866.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

Leicester Section.—Tuesday February 10 at the Bell Hotel, Leicester, at 7.30 p.m. 'Rubber Progress,' by A. J. Pickett, editor, *Rubber and Plastics Age.*

London Section. — Tuesday February 10 at the National College of Rubber Technology, Holloway Road, London, N.7. 'What Makes Rubber Strong,' by Dr L. Mullins, BRPRA, at 5.30 p.m. 'Dielectric Properties of Zinc Oxide-Rubber Mixtures,' by D. Matthews, F.N.C.R.T., D.P.I., at 7 p.m. 'Effect of State of Cure on Stress Relaxation of Natural Rubber,' by S. N. Angove, A.N.C.R.T., A.I.R.I., at 7.40 p.m. Meeting under the chairmanship of A. Fiber, A.I.R.I.

Scottish Section. — Saturday February 14. Smoking Concert.

West of England Section.—Wednesday February 11 at 7.45 p.m. Annual dinner at the George Hotel, Trowbridge.

PLASTICS INSTITUTE

South Wales and Monmouthshire Section.—Wednesday February 11 at the Angel Hotel, Westgate Street, Cardiff, at 6.30 p.m. 'The Useful Arts,' by A. Gardner-Medwin, Council of Industrial Design. Ladies' night.

Western Section.—Wednesday February 11 in the Conference Room, T. H. and J. Daniels Ltd., Lightpill, Stroud, Glos., at 7 p.m. 'Design in Plastics,' by M. O. Rowlands.

Yorkshire Section. — Wednesday February 11 at St. Mark's House, 186 Woodhouse Lane, Leeds. 'Man Made Fibres,' by Prof. J. B. Speakman, D.Sc., F.R.I.C., F.T.I., University of Leeds.

A new type of hanging wardrobe which is guaranteed mothproof is being produced by Jekmoth Home Store Ltd., Lillie Road, London, S.W.6. The material used, which is made by Wadalex Ltd., 89 Oxford Street, Manchester, is a printed cotton fabric having a transparent, high-gloss British Geon PVC finish, not previously available in this country

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from "The Trade Marks Journal"—given below are reproduced by permission of the Controller of H.M. Stationery Office.

POLYGRIP (781,501) For grips and fitted covers, all for the hand controls or foot pedals of vehicles and all made of plastics or of rubber. By L. B. Plastics Ltd., Broadholme, Belper, Derbyshire. (Class 16; January 1 1959.)

TREAMIC (782,133) For scientific apparatus and instruments included in Class 9 made of glass or plastics. By H. J. Elliott Ltd., E-Mil Works, Treforest Industrial Estate, Pontypridd, Glamorganshire. (Class 9; January 1 1959.)

DOYLEX (779,530) For articles included in Class 24 made of plastics in imitation of textile material. By Doylex Ltd., 93 South Street, Bishop's Stortford, Herts. (Class 24; January 1 1959.)

TERACHENE (780,567) For textile piece goods made wholly of polyester fibre. By The Calico Printers' Association Ltd., St. James's Buildings, Oxford Street, Manchester, 1. (Class 24; January 1 1959.)

POLY-COVER (779,786) For floor and stair coverings in sheet form made of plastics; and car mats and door mats, all made from sheet plastics. By Dunbee Ltd., Dunbee House, Blenheim Street, New Bond Street, London, W.1. To be associated with No. 779,785 (4192, 1159). (Class 27; January 1 1959.)

GRAVOFLEX (773,557) For plastics in the form of sheets, panels, plates, rods, films, tubes, blocks, strips and shaped sections, all included in Class 17. By Societe Gravograph, 2 Rue du Colonel Driant, Paris, France. Address for service is c/o George Fuery and Co., Newhall Chambers, 8 Newhall Street, Birmingham, 3. (Class 17; January 1 1959.)

CRONAFLEX (780,988) For sensitized transparent films of plastics or of paper, in sheet form, prepared for use in graphic reproduction processes. By E.I. du Pont de Nemours and Co., 1007 Market Street, Wilmington, State of Delaware, United States. Address for service is c/o Marks and Clerk, 57 and 58 Lincoln's Inn Fields, London, W.C.2. To be associated with No. 746,753 (4064, 456) and others. (Class 1; January 1 1959.)

VITRIX (780,058) For polishing machines (not domestic), punching and shearing machines, injection moulding machines, wood-working machines; and rumblers and burnishers, all being machines. By Redchurch Ltd., 9-13 Redchurch Street, London, E.2. To be associated with No. 780,059 (4199, 12). (Class 7; January 1 1959.)

PATENT LIST

Printed copies of the Specifications in the following list can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on February 4 1959

Bataafsche Petroleum Maatschappij N.V. De. Hydroxy-substituted polyethers and a process for their preparation. 808,301.

Phillips Petroleum Co. Process and catalyst for polymerization of polymerizable hydrocarbons. 808,456.

Kodak Ltd. Method and apparatus for manufacturing sheeting, film or film base of organic high polymer material. 808,344.

Hercules Powder Co. Vulcanization of rubbers. 808,302.

Open to public inspection on February 18 1959

Imperial Chemical Industries Ltd. Manufacture of synthetic filaments. 809,273.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius and Brüning. Process for dyeing shaped structures of aromatic polyesters. 809,221.

E. E. Conley. Hollow fibre reinforced resin products such as pipe fittings with moulded internal-threads and method of making same. 809,296.

T.I. (Group Services) Ltd. Manufacture of glass fibres and rods. 809,297.

Fothergill and Harvey (Research and Development) Ltd., and Vinyl Products Ltd. Bonding of fabrics to a surface or coating of polyvinyl chloride. 809,290.

Geigy Co. Ltd. Dyeing of polyamide fibres. 809,258.

Imperial Chemical Industries Ltd. Polymerizable compositions. 809,257.

Montecatini Soc. Generale per L'industria Mineraria E Chimica. Process for the preparation of di-isobutyl ketone isovalerone. 809,042.

Midland Silicones Ltd. Organosilicon co-polymers and their uses. 809,263.

A. Page. Hot water bottles. 809,234.

Connecticut Hard Rubber Co. Heat-resistant high tensile silicone rubber gum compositions and method of vulcanizing them. 809,166.

American Cyanamid Co. Production of crimped tows of polyacrylonitrile filamentary materials. 809,039.

Goodyear Tire and Rubber Co. Brake having a non-fusing brake element. 809,147.

Oleo Pneumatics Ltd., and J. H. Onions. Plastic inserts for railway buffer heads. 809,137.

R. T. Vanderbilt Co. Inc. Choraprene polymers containing tri-substituted theourea accelerators. 809,316.

Midland Silicones Ltd. Organosilicon compounds. 809,313.

Midland Silicones Ltd. Organosiloxane compositions. 809,238.

Valentinigomma S.r.L. Rubber mat or the like and its method of manufacture. 809,048.

Dayton Rubber Co. Method for making belts. 809,104.

Goodyear Tire and Rubber Co. Hydraulic automatic brake adjustment. 809,269.

F. A. Muller. Plastic shoe unit. 809,051.

Siemens-Schuckertwerke A.G. Processes for influencing the molecular structure of plastics by irradiation, more especially with electrons. 809,183.

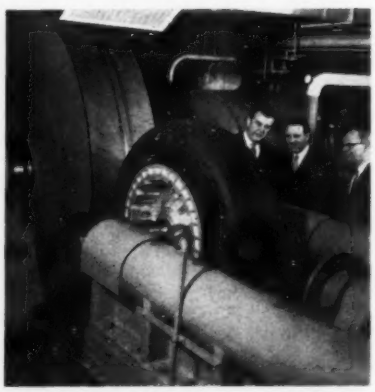
United States Rubber Co. Manufacture of polyurethane foam sheets. 809,180.

Changes of Name

Rolkin Shakeshaft Ltd. (189,846), Atlantic Street, Broadheath, Altrincham, Ches.—Name changed to Atlantic Rubber Ltd. on December 5 1958.

Norman Hampson Ltd. (464,338), 86a Manchester Road, Hyde, Ches.—Name changed to Northern Plastics Ltd. on December 15 1958.

M. G. Plastics Ltd. (577,702), 19 Mincing Lane, Blackburn. — Name changed to Plastics and Alloys Ltd. on December 16 1958.



A giant wheel, 10ft. in diameter, weighing nine tons, and capable of a circumference speed of 311 mph, is being used by the Firestone Tire and Rubber Co. in America to test tyres designed for very large high-speed jet aircraft. By forcing the tyre against the wheel when the latter is revolving at a set speed, e.g. 250 mph, and working up to such a speed from stationary, landing and take-off stresses and wear can be simulated. The weight of the aircraft is applied through the rams. Studying a wheel set up for such a test are, *left to right*, Mr J. E. Trainer, executive vice-president of Firestone, Mr R. C. Firestone, president of the company, and Mr J. J. Robson, director of engineering development

NEW COMPANIES

Light Weight Plastics Ltd. (617,251). —December 22. Capital: £500 in £1 shares. The directors are: Thomas G. Townsend, 15 Vallansgate, Longmeadow, Stevenage, Herts.; and David W. Nelson, 1 Laurel Drive, London, N.21.

Stone and Simmons Ltd. (617,476). —December 23. Capital: £5,000 in £1 shares. To acquire the business of plastic ware manufacturers carried on by Stone and Simmons at Blackfriars Road, London, S.E.1, etc. The directors are: Nathan Stone, director of Stantone Plastics Ltd., etc.; Marion Stone and Lucy Stone, all of 11 Acland Crescent, London, S.E.5. Regd. office: 224-5 Blackfriars Road, London, S.E.1.

Derota Ltd. (617,373). — December 23. Capital: £12,500 in 10,000 5% non-voting redeemable preference and 2,500 ordinary shares of £1 each. To carry on the business of manufacturers and designers of and dealers in presses of all kinds, rolling mills, equipment, plant and machinery, tools and component parts and articles for use in the metal-working, plastic and other industries, mechanical and electrical engineers, etc. The subscribers (each with one share) are: M. S. Gampell, solicitor, and S. M. Levy, secretary, both of 17 Throgmorton Avenue, London, E.C.2. The first directors are not named. Solicitors: Ashurst, Morris Crisp and Co., 17 Throgmorton Avenue, London, E.C.2, and Clifford Turner and Co., 11 Old Jewry, London, E.C.2.

Bridgend Tyre Service Ltd. (617,599). — December 29. Capital: £5,000 in £1 shares. To carry on the business of manufacturers of and dealers in tyres of all kinds, etc. The permanent directors are: William J. Preston, 3 Cradog Road, Whitchurch, Glam.; Henry B. Gibby, 1 St. Ederyns Road, Cardiff; Noel T. James, Brooklands, Langstone, Mon., all directors of Gwent Tyre Service Ltd. Regd. office: 56 Stow Hill, Newport, Mon.

Penny and Reeves Ltd. (617,689).— December 30. Capital: £40,000 in 15,000 redeemable preference and 25,000 ordinary shares of £1 each. To carry on the business of hardwood, plywood and plastic merchants, etc. The directors are: Richard H. Penny, Pen Elm, Norton Fitzwarren, Taunton; William M. L. Penny, Little Canonsgrove, Trull, Taunton, both directors of Thos. S. Penny Ltd., etc.; Arthur H. Reeves, Francis G. Reeves and Kenneth C. Marsh, all directors of Wilson and Sons Ltd., etc. Regd. office: 7, The Plains, Totnes.

Macron Ltd. (617,782).—December 31. Capital: £100 in £1 shares. To carry on the business of tooling, mould makers for plastics, mould and model makers for plastics and pattern and machinery designers, etc. The directors are: Walter H. MacNally, 6 Sheer-

water Road, Woking, Surrey; Ronald F. May, 26 Fairfax Road, Teddington, Mdx. Regd. office: 48 Windsor Street, Chertsey, Surrey.

Lionel Hook and Sons Ltd. (617,849). — December 31. Capital: £10,000 in 4,000 6% cumulative preference and 6,000 ordinary shares of £1. To carry on the business of manufacturers of dipping machines and accessories used for the production of rubber and plastic goods, for lacquering, enamelling and cellulosing, etc. The directors are: Stephenson H. Hook, 6 Main Road, Cashes Green, near Stroud; Robert L. A. Hook, 5 Council Houses, Foxmoor Lane, Ebley, near Stroud. Regd. office: Ebley, near Stroud, Glos.

Geo. Howorth Tyres (Leighton) Ltd. (617,835).—December 31. Capital: £100 in £1 shares. The directors are: George H. P. Howorth, 230 Oundle Road, Peterborough; Leonard Brooks, 430 Gladstone Street, Peterborough; directors of George Howorth Tyre Services Ltd. Regd. office: 165 Cromwell Road, Peterborough.

Cooper and Co. (Foams) Ltd. (618,010). — January 1. Capital: £50,000 in £1 shares. To carry on the business of manufacturers of and dealers in products made wholly or partly of rubber, synthetic rubber; manufacturers of and dealers in plastics, plastic foam, etc. The subscribers (each with one share) are: Eric F. Bensley, Bannet Tree House, Castlemorton, near Malvern, Worcs., company director, and Norman W. Lacey, Windwhistle, Bellfountain Road, Crickhowell, Breconshire, company secretary. Cooper and Co. (Birmingham) Ltd. and Volcrepe Ltd. have the right to appoint and remove directors. The first directors are not named. Regd. office: Winchester House, Victoria Square, Birmingham.

Increases of Capital

Ebonite Container Co. (Manufacturing) Ltd. (607,245), Tileyard Road, York Way, London, N.7.—Increased by £224,900 in £1 unclassified shares, beyond the registered capital of £100.

Watts Plastics Ltd. (548,047), 14 Christchurch Road, Lansdowne, Bournemouth.—Increased by £4,000 in £1 preference shares, beyond the registered capital of £1,000.

Lancaster Tyre Distributors Ltd. (565,185), Lancaster Terrace, Bayswater, London, W.2. — Increased by £8,300 in £1 ordinary shares, beyond the registered capital of £2,000.

Durable Plastics Ltd. (514,584), Woodbridge Industrial Estate, Guildford. — Increased by £8,500 in £1 shares, beyond the registered capital of £1,500.

Rubber Journal and International Plastics CLASSIFIED ADVERTISEMENTS

APPOINTMENTS VACANT

6d. a word. Minimum 10/- Box 2/-

APPLICATIONS are invited for the position of rubber technologist/chemist of a South African company of rubber manufacturers. Applicants must be fully experienced and capable of working under own initiative. Practical experience in synthetic/natural rubber compounding, mill and process control essential. A knowledge of mechanical mouldings, heavy duty hose and rubber to metal lining advantageous. Applications, giving full details of age, marital state, qualifications and experience, should be addressed to the Manager, P.O. Box 1982, Johannesburg, South Africa. (227)

ASSISTANTS required for work in elastomers laboratory at Hemel Hempstead. These posts call for applicants with some experience in latex and dry rubber processing or in physical testing of rubbers. An L.I.R.I. standard would be an advantage. Opportunities for further education will be afforded in appropriate cases. Five-day week. Pension scheme. Applications, giving full personal details, should be sent to:—Du Pont Co. (U.K.) Ltd., Ref.: Project 2, 76 Jermyn Street, London, S.W.1. (237)

COMPANY require rubber technologist, young man, A.I.R.I. standard, preferably with some works or laboratory experience, capable of taking some responsibility. Good opportunity with progressive company for right type.—Andre Rubber Co. Ltd., Kingston By-Pass, Surbiton, Surrey. (233)

ENGINEER with knowledge of rubber machinery, both use and design, preferably under 35, but not essential. Good prospects with expanding firm building rubber machinery in the South. State age, experience, qualifications and salary required. —Box 245. (245)

EXPERIENCED man required to take charge of rapidly expanding latex compounding department. Salary according to age and experience; pension scheme; assistance with housing if necessary. Apply in writing to:—Works Manager, J. Allen Rubber Co., Ltd., Harbour Road, Lydney, Glos. (234)

MOULDING department. Foreman required for rubber company in Hertfordshire. Apply stating age and experience.—Box 235. (235)

RUBBER/PLASTICS technologist required for progressive factory in London area. Minimum L.I.R.I. or similar. Age 30 to 45. Pension scheme. Will be in sole charge of laboratory. Knowledge of synthetic and resin rubbers preferable.—Box No. W.3005, Haddons, Salisbury Square, London, E.C.4. (236)

APPOINTMENTS VACANT (continued)

RESEARCH ASSOCIATION OF BRITISH RUBBER MANUFACTURERS requires a rubber technologist, interested in writing, to assist in familiarizing members with the work of the association and to interpret its results to the industry. The appointment will be on the technical officer scale, £550 x £35—£935, with starting salary according to age and experience. Reply to:—Secretary, Shawbury, Shrewsbury. (239)

RUBBER technologist (age 28 to 35 years) as leader of laboratory section engaged in development of rubber and PVC conveyor and transmission belting, at rubber and plastics factory, Newcastle upon Tyne. Applicants must have first class experience, a flair for experimental work and ability to co-operate with laboratory hose and compounding sections and productions departments. An attractive salary is offered to a man of outstanding ability who will be a senior member of an enthusiastic development team in a well-established and expanding group. Pension scheme, housing assistance and payment of removal expenses. Further details may be obtained by sending full particulars of career to:—Group Appointments Officer, George Angus and Co. Ltd., Angus House, Newcastle upon Tyne, 1. (246)

RUBBER technologist. A further opportunity arises for a keen, enthusiastic chemist with A.I.R.I., A.N.C.R.I. or similar qualification and preferably with synthetic rubber compounding experience to work in a group developing materials and processing methods for rubber and plastics materials for use in aircraft and industrial fuel and hydraulic equipment. Apply in writing to:—Personnel Manager, Joseph Lucas (Gas Turbine Equipment) Ltd., Shaftmoor Lane, Hall Green, Birmingham, 28. (247)

THE Ault and Wiborg Group require a chemist, preferably technically or academically qualified, to look after a section in its research laboratory. Experience in rubber, plastics or adhesives is essential. The company has further plans for expansion and prospects and remuneration are excellent. Please apply with full particulars to:—Research, Ault and Wiborg Ltd., Standen Road, S.W.18. (238)

WORKS chemist required, preferably with experience in cable manufacture. Good salary and prospects. Contributory pension scheme. Reply stating age, qualifications and experience, to:—General Manager, The Metropolitan Electric Cable and Construction Co. Ltd., Clyde Works, Chadwell Heath, Essex. (248)

APPOINTMENTS VACANT
(continued)

WELSH COLLEGE OF ADVANCED TECHNOLOGY,

CATHAYS PARK, CARDIFF.

DEPARTMENT OF CHEMISTRY AND BIOLOGY.

Applications are invited for two posts at senior lecturer level in the chemistry section of the department, duties to commence on September 1, 1959. Salary—in accordance with the Burnham Technical Scales—£1,417 10s. x £52 10s.—£1,627 10s. per annum. 1. Senior lecturer in chemical technology. For this post candidates should have a high qualification in chemistry, together with experience of chemical plant, or a qualification in chemical engineering and appropriate experience. The duties of the post will include the control of pilot plant for the processing of plastics and rubber materials, and experience in this field would be advantageous. 2. Senior lecturer in chemistry. For this post a high academic qualification, together with research experience is required. The candidate will be required to teach either physical or inorganic chemistry to students pursuing courses leading to the Graduate Membership of the Royal Institute of Chemistry. Experience in the chemistry of high polymers would be regarded as an asset. For either post teaching experience, whilst obviously desirable, is not regarded as essential. Holders of these posts will be required to carry on active research and, if required, to direct other research activities. Further particulars concerning these appointments, together with forms of application, may be obtained from the principal, to whom applications should be sent as soon as possible.

Robert E. Presswood,
Clerk to the Governors.

City Hall,
Cardiff. (241)

APPOINTMENTS WANTED
6d. a word, Minimum 10/- Box 2/-

EXPERIENCED technologist with extensive knowledge of synthetic rubbers, plastics and resins, seeks progressive position with company of good standing. The applicant has managerial experience and an excellent record in the rubber industry. Would prefer position with company in southern half of England.—Box 242. (242)

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3,000-TON belting press for Brammer and similar precision sheeting, platens 13ft. x 4ft. 2,000-ton 6-daylight platen press, platens 12ft. 6in. x 7ft. 9in., with self-contained pump unit. 1,000-ton 5-daylight press, platens 6ft. x 4ft.—Reed Brothers (Engineering) Ltd., Replant Works, Woolwich Industrial Estate, London, S.E.18. Telephone: Woolwich 7611/6. (240)

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LATEX foam off-cuts urgently required—also plastic scrap, all grades, handbag, raincoat, polythene, etc.—Box 221.

Rapidly expanding company wishes to consider for immediate purchase the following plant in good condition:

A No. 9 Banbury Mixer, complete with drive units and 84in. mill, or alternatively with 2 x 60in. mills.

Full details to Box 244.

(244)

WANTED, modern No. 21 Cochran vertical boiler, 105 psi, with fittings and extended skirt.—Box 229. (229)

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'COTSWOLD' dipping machines and circulating tanks for latex and PVC. New catalogues now available on request. —Lionel Hook and Sons, Ebley, Stroud, Glos. Tel.: Stonehouse 614/5. (380)

MANUFACTURERS of roughing machines for rubber sheeting, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy, Ltd., Imperial Works, Menston, Nr. Leeds. (238R)

MANUFACTURER wanted to produce a boot and shoe shape preserver, an inflatable shoe-tree or last. A recent patent in rubber and plastic with small inflator.—Box 243. (243)

SILICONE rubber moulding. Capacity available for prototype and repetition work.—Esco (Rubber), Ltd., 2 Stothard Place, Bishopsgate, London, E.C.2. (170)

SLITTING capacity available for tape production.—Phoenix Rubber Co. Ltd., 2k Buckingham Avenue, Trading Estate, Slough, Bucks. Tel. No. 22307. Grams: Phenrub, Slough. (54)

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